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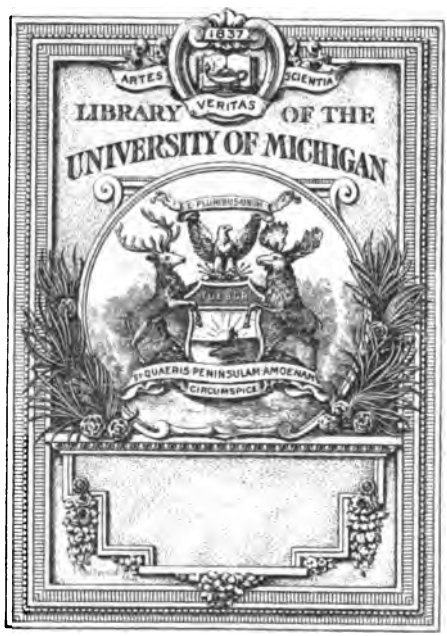
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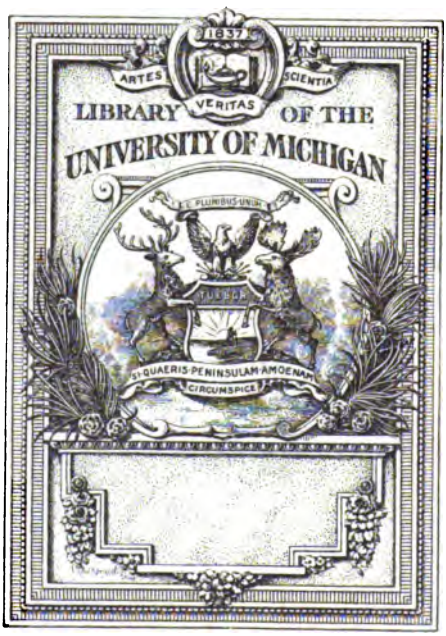
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SMITHSONIAN INSTITUTION.
UNITED STATES NATIONAL MUSEUM.

BULLETIN

OF THE

UNITED STATES NATIONAL MUSEUM.

No. 35.

BIBLIOGRAPHICAL CATALOGUE OF THE DESCRIBED TRANSFORMATIONS OF NORTH AMERICAN LEPIDOPTERA.

BY

HENRY EDWARDS.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1889.

SMITHSONIAN INSTITUTION.
UNITED STATES NATIONAL MUSEUM.

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BULLETIN

OF THE

UNITED STATES NATIONAL MUSEUM.

No. 35.

BIBLIOGRAPHICAL CATALOGUE OF THE DESCRIBED TRANSFORMATIONS OF NORTH AMERICAN LEPIDOPTERA.

BY

HENRY EDWARDS.

WASHINGTON:
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1889.

ADVERTISEMENT.

The present publication (Bulletin No. 35) is the forty-sixth of a series of papers intended to illustrate the collections belonging to the United States, and constituting the National Museum, of which the Smithsonian Institution was placed in charge by the act of Congress of August 10, 1846.

The publications of the National Museum consist of two series—the Bulletins, of which this is No. 35, in continuous series, and the Proceedings, of which the eleventh volume is now in press.

The volumes of Proceedings are printed, signature by signature, each issue having its own date, and a small edition of each signature is distributed to libraries promptly after its publication.

Full lists of the publications of the Museum may be found in the current catalogues of the publications of the Smithsonian Institution.

Papers intended for publication in the Proceedings and Bulletins of the National Museum are referred to the Committee on Publications, consisting of the following members: T. H. Bean, A. Howard Clark (editor), Otis T. Mason, John Murdoch, Leonhard Stejneger, Frederick W. True, and Lester F. Ward.

S. P. LANGLEY,
Secretary of the Smithsonian Institution.

Washington, January 23, 1889.

BIBLIOGRAPHICAL CATALOGUE

OF THE

DESCRIBED TRANSFORMATIONS

OF

NORTH AMERICAN LEPIDOPTERA.

BY

HENRY EDWARDS.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1889.

PREFACE.

I believe that the present Catalogue will supply a want that has long been felt by many entomologists, and though it may be far from perfect, it will, I trust, be acceptable to the students of the earlier stages of North American Lepidoptera. In its compilation I have occupied a good portion of the spare time at my command for three years past, and have carefully examined every publication that has been accessible to me. I know that many references may possibly have been omitted, the works in which they occur not being within my reach, but I trust that few if any *species* have been overlooked altogether. Should such be the case, however, I shall be greatly indebted to my entomological friends if they will point them out to me, as it is my intention to issue a supplement to this list once a year, and thus keep up with the knowledge of what descriptions have been recorded. In the nomenclature I have followed the catalogue of W. H. Edwards in the *Diurnæ;* Grote's Check List (1882) in the *Macro-Lepidoptera;* Professor Fernald in the *Tortricidæ;* Stainton, Clemens, and Chambers in the *Tineidæ;* and Lord Walsingham in the *Pterophoridæ.* Of the two latter families no catalogue of our species exists, and I therefore ask for indulgence should any errors in the sequence of the genera or otherwise be detected. It has been my aim to make the references as clear but at the same time as brief as possible, and I have, as will be seen, arranged all descriptions according to the date of their publication. When the words (quotes Harris, *e. g.*) occur after the name of the describer, it will be understood that the *text* of the description has been used; but when the words (*after* Riley or Abb. Sm., etc.) are found, it will mean that the *drawing* or *engraving* has been borrowed from these authors. In all the species, where known to me, the food-plant has been given, except in the case of the *Arctias* and in *Agrotis*, the former being almost general feeders, and the latter living chiefly on grasses and low herbaceous plants. If a reference is followed by the word (brief), it signifies that the same is but a mere mention, often perhaps only a food-plant, but it has been deemed advisable to include such notices. In the appendix are a few species not referable to any known insects, and I have added a short list of some papers which may be of value to the students of transformations. I should like also to call attention to the admirable "life histories" by Messrs. Riley, French, Edwards, Saunders, Packard, H. H. Clark, and others, which are scattered through Entomological Reports, both State and National, the Canadian Entomologist, "Papilio," "Entomologica Americana," and kindred publications, papers which may advantageously be studied by future

describers as models of style and accuracy. I desire to tender my warmest thanks to Professor Riley, Mr. S. H. Scudder, Mr. J. B. Smith, Mr. W. H. Edwards, and Mr. W. Beutenmüller for much valuable aid, both in the loan of publications and the copying of references, thus greatly assisting me in my task.

I earnestly hope that the publication of this catalogue will be the means of inducing observers to take a wider and more extended interest in the preparatory stages, and to place as early as possible upon record the results of their studies. It will be readily seen that though, up to the end of the *Bombycidæ*, a good deal has already been done, the knowledge of the transformations of the *Noctuidæ* and succeeding families is slight indeed, and it is to these groups that attention is especially directed. Should this list be instrumental in adding to our information regarding the many species of Lepidoptera, of whose earlier stages we now know so little, my labor will be rewarded, and the many hours passed in its preparation will not have been occupied in vain.

HENRY EDWARDS

NUMBER OF SPECIES OF WHICH EARLIER STAGES ARE RECORDED IN THIS CATALOGUE.

NAME.	No. of species.
Rhopalocera	180
Sphingidæ	55
Ægeriadæ	16
Zygænidæ	13
Bombyces	178
Noctuidæ	188
Geometridæ	101
Pyralidæ	39
Tortricidæ	61
Tineidæ	222
Pterophoridæ	16
Total	1,069

PRINCIPAL AUTHORS AND PUBLICATIONS QUOTED.

ACADEMY NAT. SCIENCES, PHILA., Proc.
ABBOT AND SMITH. Lepidopterous Insects of Georgia.
AMERICAN ENTOM. SOC., Transactions of.
AMERICAN ENTOMOLOGIST.
AMERICAN ASSOC. ADV. SCI., Proceedings of.
AMERICAN NATURALIST.
BALLARD, MRS. J. P. Insect Lives.
BETHUNE, C. J. S. Papers in Canad. Entom.
Reports Entom. Soc. Ontario.
BOISDUVAL, DR. J. A. Lepidoptera de la Californie.
Species General, Rhopalocera.
Species General, Heterocera.
BOISDUVAL, DR., AND J. LECONTE. Hist. Lepid. N. America.
BOSTON SOC. NAT. HISTORY., Proc.
BROOKLYN ENTOM. SOC., Bulletin of.
BUFFALO SOC. NAT. HIST., Bulletin of.
CALIFORNIA ACAD. SCIENCES, Proc. of, vols. 1–6.
CANADIAN ENTOMOLOGIST, vols. 1–21.
CHAPMAN, A. W. Papers in Canadian Entomologist.
CHENU-LUCAS—DEMARETS. Encyc. Hist. Nat., vols. 1–2.
CLEMENS BRACKENRIDGE. Tineidæ of N. Amer., (edit. Stainton.)
Papers in Proc. Am. Entom. Soc.
COMSTOCK, J. H. Rept. Entomologist, U. S. Dept. Agr., 1879–'80.
Report on Cotton Insects.
Insects Injurious to Sugar Cane.
COOK, A. J. Papers in Michigan Reports.
COQUILLETT, D.W. Papers in Trans. Dept. Agr., Illinois.
Papers in Papilio.
CURTIS, JOHN. British Entomology.
CUTTING, HIRAM, M. D. Pests of Farm. N. Hamp. Bd. Agr.
DAVENPORT ACAD. NAT. SCIENCES, Proceedings of, vols. 1–5.
DUNCAN, JAMES. Naturalists' Library. (Editor.)
DRURY, DRU. Illustr. Exotic Entomology, (Westwood edit.)
EDWARDS, HENRY. Papers in Proc. Cal. Acad. Sciences.
Papers in Papilio.
Papers in Entomologica Americana.
Kingsley's Standard Natural History, vol. 2.
EDWARDS, WM. H. Papers in Proc. Entom. Soc. Phila.
Papers in Trans. Am. Entom. Soc.
Papers in Canadian Entom.
Papers in Papilio.
Butterflies of N. America, series 1, 2, 3.
ELWES, H. J. Papers in Proc. Zoölog. Soc. London.
EMMONS, E. Natural Hist. N. York, Entom.
ENTOMOLOGICA AMERICANA, vols. 1–4.
ENTOMOLOGICAL SOC. PHILA., Proc. of, vols. 1–6.
ENTOM. MONATSCH, (Wien,) vols. 1–8.
FERNALD, C. H. Papers in Canadian Entom.
Papers in Papilio.
Kingsley's Standard Natural History, vol. 2.
Butterflies of Maine.
Sphingidæ of N. England.
FIELD AND FOREST, (editor, C. R. Dodge.)
FIGUIER, L. The Insect World. (Transl.)
FITCH, ASA. Reports on Insects of N. York, vols. 1–14.
Papers in Trans. N. Y. State Agr. Soc.
FLETCHER, J. Repts. Entom. Ontario.
Trip to Nepigon, 1888.
FRENCH, G. H. Butterflies of Eastern U. States.
Papers in Canad. Entom.
Papers in Papilio.
FYLES, T. W. Papers in Canad. Entom.
GAYLORD, W. Report in Trans. N. Y. State Agr. Soc.
GLOVER, TOWNEND. Reports of Entomologist U. S. Dept. Agr.
GOODELL, L. W. Papers in Papilio and Canad. Entom.
GOSSE, P. H. Canadian Naturalist.
Letters from Alabama.
GROTE, AUG. R. Papers in Proc. Entom. Soc. Phila.
Papers in Canad. Entomol.
Papers in N. American Entomologist.
Papers in Papilio.
GUNDLACH, JUAN. Entomologia Cubana.
HARRIS, THADDEUS W. Insects Injurious to Vegetation.
Papers in Trans. N. Y. State Agr. Soc., etc.
Entomological Correspondence.
HUBBARD, H. G. Insects affecting the Orange.
HUMPHREYS, NOEL. Genera of British Moths.
ILLINOIS, Trans. Dept. Agriculture of, Trans. State Agr. Soc. of.

INSECT LIFE. Vol. 1, (U. S. Entomologist and his assistants).
IOWA, Trans. Horticul't. Soc. of.
JAEGER, B. Life of N. American Insects.
KANSAS. Trans. Kansas Acad. Sciences.
Agricultural Reports of.
KENTUCKY. Bureau of Agriculture.
KIRBY, W. F. Europ. Butt. and Moths.
KOLLAR, V. Injurious Insects. (London edition.)
LINTNER, J. A. Papers in N. Y. State Cab. N. History.
Papers in Trans. N. Y. State Agr. Soc.
Papers in Proc. Entom. Soc. Phila.
Papers in Trans. Amer. Entom. Soc.
Papers in Canadian Entomologist.
Papers in Papilio.
Repts. N. Y. State Entom.
MAINE. Repts. Board Agriculture.
MANN, B. PICKMAN. Papers in Psyche.
MASSACHUSETTS. Repts. Board Agriculture.
MEAD, THEODORE L. Diurn. Lepid. Wheeler's Geol. Survey.
MICHIGAN. Repts. State Board Agriculture.
MIDDLETON, MISS NETTIE. Repts. Dept. Agr., Illinois.
MINNESOTA. Statistics of.
MINOT, C. J. Papers in Amer. Naturalist.
MISSOURI. Reports on Noxious and Beneficial Insects, (Riley.)
Agricultural Reports.
MORRIS, REV. J. G. Synopsis N. American Lepid.
NEW JERSEY, Agricultural Reports of.
NEW YORK. Trans. State Agr. Soc.
State Cabinet N. History.
NEWMAN, EDWARD. British Moths.
NORTH CAROLINA. Agricultural Reports.
Reports Agric. Experim. Station.
ONTARIO, Reports Entom. Soc. of.
OTTAWA. Trans. Field Nats. Club, vols. 1-3.
OTTAWA NATURALIST, vols. 1-3.
PACKARD, ALPHEUS S. Guide to Study of Insects.
Injurious Insects, new and little known.
Notes on Zygænidæ.
Injurious Insects of the West, (Hayden's Reports.)
Half-hours with Insects.
Monograph of the Geometrid Moths.
Insects Injurious to Forest and Shade-trees.
PAPILIO, (edit. Hy. Edwards and E. M. Aaron,) vols. 1-4.
PEALE, TITIAN. Lepidoptera Americana.
PENNSYLVANIA, Agr. Reports of.
POEY, FELIPPE. Cent. Lepid. Cubana.
PRACTICAL ENTOMOLOGIST, (edit. B. D. Walsh.)
PSYCHE, (edit. B. P. Mann,) vols. 1-3.
RATHVON, S. S. Rept. Agr. Penna.
RATZEBURG, J. Die Forst-insecten.
RILEY, C. V. Repts. Insects, Missouri.
Papers in Trans. Am. Entom. Soc.
Papers in Canad. Entomologist.
Papers in Papilio.
SAUNDERS, WM. Insects Injurious to Fruits.
Papers in Canad. Entom.
SAY, THOMAS. N. American Entom.
SCHAUS, WM., JR. Papers in Papilio, etc.
SCUDDER, SAM'L H. Papers in Proc. Boston N. Hist. Soc.
Papers in Canad. Entom.
Papers in Papilio.
Butterflies, their structure, etc.
SILK MANUFACTURE, Treatise on. Lardner's Cyclopedia.
SMITH, JOHN B. Monograph of Sphingidæ.
STAINTON, H. T. British Butterflies and Moths.
STEPHENS, J. F. Illustrations Brit. Entom.
STRECKER, HERMAN. Lepidoptera, Rhop. et Heter.
STRETCH, R. H. Zygænidæ and Bombycidæ N. Amer.
TENNEY, SANBORN. Manual of Zoölogy.
TRENTON, (N. J.) Trans. N. Hist. Soc. of.
THOMAS, CYRUS. Papers in Illinois Reports.
VERMONT. Repts. State Bd. Agr.
VIRGINIA, Agric. Repts. of.
WALSINGHAM, THOMAS, LORD. Pterophoridæ of Cal. and Oreg.
N. Amer. Tortricidæ Heteroc. B. Mus.
Papers in Trans Entom. Soc. London.
WESTWOOD, J. O. Introd. Mod. Class. Insects.
(Edit. by.) Drury's Exot. Entom.
Introd. Entom.
WISCONSIN. Trans. Agr. Soc.
WOOD, REV. J. G. Natural Hist., vol. 2, (Entom.)
Insects at Home.
Insects Abroad.

ERRATA.

Page 17, line 10 from top—read *Astragalus, Crotalaria* for *Astragalus crotalaria.*
Page 20, line 19 from top—read *Argynnis* for *Argynis.*
Page 21, line 13 from top and line 27 from bottom—read *Castilleia* for *Castileja* and *Castelejia.*
Page 45, line 7 from top—read *Ulmus americana* for *Ulmus americanus.*
Page 58, line 21 from top—read *Œnothera* for *Ænothera.*
Page 61, line 6 from top—read *Asclepias tuberosa* for *Asclepias tuberosum.*
Page 64, line 3 from top—read *Quercus* for *Quereus.*
Page 67, top line—read *Thyridopteryx* for *Thyridoptery.*
Page 94, line 22 from top—read *Cruciferæ* for *Crucifercæ.*
Page 94, line 27 from top—read *Anarta* for *Ararta.*
Page 109, line 1 from bottom—read *Fuchsia* for *Fuschia.*
Page 112, line 1 from bottom—read *Oxycoocus* for *Oocycoccus.*

DESCRIBED TRANSFORMATIONS OF NORTH AMERICAN LEPIDOPTERA.

RHOPALOCERA.

Papilio ajax. L. (and vars.)

1797. Larva, chrys., (col'd figs.) *Abbot—Smith.* Lep. Ins. Georgia, pl. 4.
1833. Larva, chrys., (col'd figs.) *Boisduval—Leconte.* Hist. Lep. N. Amer., pp. 4–8, pl. 1–2.
1836. Larva. *Boisduval.* Spec. Gener. Diurnæ, vol. 1, pp. 257–259.
1859. Larva, chrys., (figs.) *P. H. Gosse.* Letters from Alabama, p. 51.
1864. Larva. *Jaeger.* Life N. Amer. Ins., p. 209.
1871. Life hist., (col'd figs.) *W. H. Edwards.* Butt. N. Amer., 1st series, pl. Papilio, 1, 2, 3.
1880. Larva. *Miss N. Middleton.* Trans. Dep't Agr. Ill., vol. 18, Appendix, p. 74.
1884. Larva, (figs.) *Dr. A. Gruber.* Jena. Zeitschr. Nat. Copied in Papilio, vol. 4, p. 88.
1886. Life hist., (condensed.) *G. H. French.* Butt. East. U. States, p. 85.

FOOD PLANT. *Asimina triloba.* (Pawpaw.)

Papilio philenor. Fab.

1797. Larva. *Abbot—Smith.* Lep. Ins. Georgia, pl. 3.
1833. Larva, (col'd figs.) *Boisduval—Leconte.* Hist. Lep. N. Amer., p. 29, pl. 11.
1836. Larva, chrys. *Boisduval.* Spec. Gener. Diurnæ, vol. 1, p. 325.
1837. Larva, chrys. *Westwood,* (quotes Abb.–Sm.) Drury's Ill. Exot. Entom., vol. 1, p. 21.
1861. Larva. *Morris,* (quotes Bois.–Lec.) Synop. Lep. N. Amer., p. 6.
1864. Larva. *Jaeger.* Life N. Amer. Ins., p. 209.
1869. Larva, chrysalis, (figs.) *Harris.* Entom. Corres., p. 273.
1870. Life history, (figs.) *Riley.* 2d Missouri Rept., p. 116.
1873. Larva, chrysalis. *Hy. Edwards.* Proc. Cal. Acad. Sc.
1874. Chrysalis, (fig.) *Scudder.* Geology N. Hampshire, pl. A.
1875. Chrysalis. *Hy. Edwards.* Proc. Cal. Acad. Sc., vol. 5, p. 162.
1877. Larva. *G. H. French.* Trans. Dept. Agr. Ill., vol. 15, p. 136.
1880. Larva, (figs.) *D. W. Coquillett,* (quotes Riley.) Trans. Dept. Agr. Ill., vol. 18, Appendix, p. 164.
1880. Larva, (figs.) *Miss N. Middleton.* Trans. Dept. Agr. Ill., vol. 18, Appendix, p. 73.
1880. Larva, chrysalis, (figs.) *W. Saunders.* Rept. Entom. Soc. Ontario, p. 37.
1881. Life hist. *W. H. Edwards.* Canad. Entom., vol. 13, p. 9.
1881. Larva, chrysalis, (figs.) *S. H. Scudder.* Butterflies, their structure, etc., p. 22.
1884. Larva, (figs.) *Dr. A. Gruber.* Jena Zeitschr. Nat. Copied in Papilio, vol. 4, p. 88.
1886. Life history, (figs.) *G. H. French.* Butt. East. U. States, p. 88.

FOOD PLANTS. Species of *Aristolochia.*

Papilio zolicaon. Bdv.

1873. Larva, chrysalis. *Hy. Edwards.* Proc. Cal. Acad. Sc., vol. 5, p. 163.
1875. Larva, (col'd figs.) *W. H. Edwards.* Butt. N. Amer., 2d series, pl. Papilio, 6.
1884. Life hist. *W. H. Edwards.* Papilio, vol. 4, p. 162.

FOOD PLANTS. Species of *Umbelliferæ.*

Papilio brevicauda. Saund.

1873. Egg, young larva, (figs.) *H. Strecker*, (quotes Couper in lit.) Rhopal. et Heteroc. pp. 49–69, pl. 8.
1875. Egg, larva (col'd fig.) *W. H. Edwards.* Butt. N. Amer., 2d series, pl. Papilio, 8.
1880. Life hist., (col'd figs.) *W. H. Edwards.* Butt. N. Amer., 2d series, part 9, pl. Papilio, 8.
1883. Larva. *P. H. Gosse.* in Journal from 1832 to 1835. Canad. Entom., vol. 15, p. 45.
1884. Larva, (brief.) *Gruber.* Jena Zeitschr. Nat. Copied in Papilio, vol. 4, p. 86.
1885. Egg, larva. *W. H. Edwards*, (quotes Couper in lit.) Butt. N. Amer., 2d series, pl. 13.

FOOD PLANTS. Various species of *Umbelliferæ.*

Papilio machaon. L. var. **aliaska.** Scud.

1884. Larva, (col'd figs.) *W. H. Edwards.* Butt. N. Amer., 2d series, pl. 14.

FOOD PLANT. Species of *Umbelliferæ.*

Papilio oregonia. Edw.

1882. Larva, chrysalis. *R. H. Stretch.* Papilio, vol. 2, p. 120.

FOOD PLANT. "Wild parsnip."

Papilio asterias. Tab.

1833. Larva, chrys., (col'd figs) *Boisduval—Leconte.* Hist. Lep. N. Amer., p. 14, pl. 4.
1836. Larva, chrys. *Boisduval.* Spec. Gener. Diurnæ, vol. 1, p. 333.
1841. Life history, (brief.) *Harris.* Ins. Inj. Vegetat., 1st edit., p. 212.
1852. Life history, (brief.) *Harris.* Ins. Inj. Vegetat., 2d edit., p. 231.
1857. Larva, chrysalis, (figs.) *Anonymous.* Canad. Nat. and Geolog., vol. 2, p. 222.
1861. Larva. *Morris*, (quotes Bois.-Lec.) Synop. Lep. N. Amer., p. 6.
1862. Life history, (col'd figs.) *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 263, pl. 4.
1864. Egg, larva, chrysalis. *Lintner.* Proc. Entom. Soc. Phila., vol. 3, p. 51.
1864. Larva, (fig.) *Jaeger.* Life N. Amer. Ins., p. 208.
1867. Larva, chrys., (figs.) *Sanborn Tenney.* Manual of Zoology, figs. 281, 282.
1869. Larva. *Harris.* Entom. Corres., p. 270.
1873. Larva, chrysalis. *Hy. Edwards.* Proc. Cal. Acad. Sc., vol. 5, p. 164.
1876. Larva. *Saunders.* Rept. Entom. Soc. Ontario, p. 38.
1877. Larva. *Packard.* Inj. Ins. West, Hayden's Rept., p. 765.
1877. Larva. *G. H. French.* Trans. Dept. Agr. Ill., vol. 15, p. 137.
1878. Larva, chrys. *Dewitz.* Zeitsch. gesament. natur.
1878. Larva, chrys., (figs.) *H. Dewitz.* Weigemann Archiv. Naturgesch, p. 4, pl. 1.
1879. Larva, chrysalis, (figs.) *Mrs. J. P. Ballard.* Insect Lives, p. 32.
1880. Larva. *Miss N. Middleton.* Trans. Dept. Agr. Ill., App., vol. 18, p. 74.
1880. Larva. *D. W. Coquillett.* Trans. Dept. Agr. Ill., vol. 18, App., p. 173.
1881. Larva, (figs.) *S. H. Scudder.* Butterflies, their structure, etc., p. 24.
1884. Egg, larva, chrys. *C. H. Fernald.* Butterflies of Maine, p. 22.
1884. Larva. *Dr. A. Gruber.* Jena Zeitschr. Nat. Copied in Papilio, vol. 4, p. 84.
1886. Life hist., (figs.) *H. French.* Butt. East. U. States, p. 92.

FOOD PLANTS. Various species of *Umbelliferæ.*

Papilio troilus. L.

1797. Larva, chrys., (col'd figs) *Abbot—Smith*, (as P. ilioneus.) Lep. Ins. Georgia, pl. 2.
1833. Larva. *Boisduval—Leconte.* Hist. Lep. N. Amer., p. 26, pl. 10.
1836. Larva. *Boisduval.* Spec. Gener. Diurnæ, vol. 1, p. 335.

1857. Larva, chrysalis, (figs.) *Anonymous.* Canad. Nat. and Geolog., vol. 2, p. 312.
1861. Larva. *Morris,* (quotes Bois.-Lec.) Synop. Lep. N. Amer., p. 5.
1862. Larva, chrysalis. *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 266.
1864. Larva. *Jaeger.* Life N. Amer. Ins., p. 209.
1869. Larva. *Saunders.* Canad. Entom., vol. 1, p. 73.
1869. Larva, stages of. *Harris.* Entom. Corres., p. 271, pl. 2 and 4.
1877. Larva, chrysalis. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 138.
1880. Larva. *Miss N. Middleton.* Trans. Dept. Agr. Ill., vol. 18, App., p. 74.
1881. Larva, chrys. *Gundlach.* Entom. Cubana, p. 136.
1881. Chrysalis, (figs.) *Scudder.* Butterflies, their structure, etc., p. 44, pl. 60.
1884. Larva. *Dr. A. Gruber.* Jena Zeitschr. Nat. Copied in Papilio, vol. 4, p. 87.
1886. Larva, chrysalis. *French.* Butt. East. U. States, p. 93.

FOOD PLANTS. *Laurus, Sassafras.*

Papilio palamedes. *Drury.*

1833. Larva. *Boisduval—Leconte.* Hist. Lep. N. Amer., p. 17, pl. 5.
1836. Larva, chrys. *Boisduval.* Spec. Gener. Diurnæ, vol. 1, p. 338.
1837. Larva. *Westwood,* (quotes Bois.) Drury's Ill. Exot. Entom., vol. 1, p. 36.
1861. Larva. *Morris,* (quotes Bois.-Lec.) Synop. Lep. N. Amer., p. 7.
1864. Larva. *Jaeger.* Life N. Amer. Ins., p. 210.
1881. Life history. *W. H. Edwards.* Canad. Entom., vol. 13, p. 119.
1886. Life hist., (condensed.) *French.* Butt. East. U. States, p. 95.

FOOD PLANTS. *Laurus, Citrus.*

Papilio turnus. L.

1833. Larva, (col'd fig.) *Boisduval—Leconte.* Hist. Lep. N. Amer., p. 19, pl. 7.
1836. Larva, chrysalis. *Boisduval.* Spec. Gener. Diurnæ, vol. 1, p. 339.
1840. Larval stages, chrysalis. *P. H. Gosse.* Canad. Naturalist, pp. 249, 293.
1856. Larva. *Fitch.* 3d Rept. Ins. N. York, p. 341.
1857. Larva, chrysalis. *Anonymous.* Canad. Nat. and Geolog., vol. 2, p. 223.
1861. Larva. *Morris,* (quotes Bois.-Lec.) Synop. Lep. N. Amer., p. 2.
1862. Larva, chrysalis, (figs.) *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 268.
1863. Larva. *B. D. Walsh.* Proc. Entom. Soc. Phila., vol. 1, p. 352.
1863. Chrysalis. *J. A. Lintner.* Proc. Entom. Soc. Phila., vol. 3, p. 51.
1869. Egg, larval stages. *Saunders.* Canad. Entom., vol. 1, pp. 51, 74.
1873. Life hist., (brief.) *Saunders.* Rept. Entom. Soc. Ontario, p. 21.
1874. Life history. *Saunders.* Canad. Entom., vol. 6, p. 2.
1876. Larva. *G. H. Perkins.* 2d Rept. Vermont State Board Agric., p. 589.
1877. Life hist., (col'd figs.) *W. H. Edwards.* Butt. N. Amer., 2d series, pl. Papilio, 3.
1877. Larva. *Packard.* Half-hours with Insects, p. 180.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 139.
1879. Larva, (figs., brief.) *Saunders.* Rept. Entom. Soc. Ontario, p. 73, fig. 4.
1880. Larva. *Miss N. Middleton.* Trans. Dept. Agr. Ill., vol. 18, p. 74.
1880. Larva. *D. W. Coquillett.* Trans. Dept. Agr. Ill., vol. 18, p. 173.
1883. Egg, larval stages, chrysalis (figs.) *Saunders.* Ins. Injur. Fruits, p. 83.
1884. Egg, larva, chrysalis (figs.) *Fernald.* Butt. of Maine, p. 24.
1884. Larva. *Dr. A. Gruber.* Jena Zeitschr. Nat. Copied in Papilio, vol. 4, p. 86.
1886. Life history, (figs. larva and chrys.) *French.* Butt. East. U. States, p. 100.

FOOD PLANTS. *Prunus, Cerasus, Liriodendron.*

Papilio turnus, dim. form, **glaucus,** L.

1833. Larva, chrysalis. *Boisduval—Leconte.* Hist. Lep. N. Amer., p. 22, pl. 9.

1836. Larva, chrys. *Boisduval.* Spec. Gener. Diurnæ, vol. 1, p. 336.
1856. Larva. *Fitch.* 3d Rept. Inj. Ins. N. York, p. 376.
1859. Larva, (brief.) *P. H. Gosse.* Letters from Alabama, p. 123.
1877. Young larva, (col'd fig.) *W. H. Edwards.* Butt. N. Amer., 2d series, pl. Papilio, 4.
1881. Egg, (fig'd.) *Scudder.* Butterflies, their structure etc., p. 7.

Papilio eurymedon. Bois.

1833. Larva, (col'd fig.) *Titian Peale.* Lep. Americana, pl. 1.
1873. Larva, chrysalis. *Hy. Edwards.* Proc. Cal. Acad. Sc., vol. 5, p. 164.
1874. Larva, chrysalis, (col'd figs.) *W. H. Edwards.* Butt. N. Amer., 2d series, pl. Papilio, 1.

FOOD PLANT. *Rhamnus californicus.*

Papilio rutulus. Bdv.

1870. Larva, chrysalis. *S. H. Scudder.* Proc. Boston Soc. Nat. Hist., vol. 19, p. 221. (Printed as P. eurymedon in error.)
1873. Chrysalis. *Hy. Edwards.* Proc. Cal. Acad. Sc., vol. 5, p. 165.
1878. Larva. *T. L. Mead.* Psyche, vol. 2, p. 180.
1882. Larval stages. *Hy. Edwards.* Papilio, vol. 2, p. 112.
1883. Larval stages. *W. H. Edwards.* Papilio, vol. 3, p. 2.
1885. Life history, (col'd figs.) *W. H. Edwards.* Butt. N. Amer., 2d series, pl. 12, 13.

FOOD PLANTS. *Alnus viridis, Salix sp.*

Papilio daunus. Bdv.

1833. Larva, (col'd fig.) *Titian Peale.* Lep. Americana, pl. 1.
1873. Chrysalis. *Hy. Edwards.* Proc. Cal. Acad. Sc., vol. 5, p. 325.
1883. Larva. *W. H. Edwards.* Papilio, vol. 3, p. 2.
1884. Larva. *W. Schaus, jr.* Papilio, vol. 4, p. 100.

FOOD PLANTS. *Prunus, Cerasus.*

Papilio pilumnus. Bdv.

1884. Larva, chrysalis. *W. Schaus, jr.* Papilio, vol. 4, p. 100.

FOOD PLANT. "Feeds on Laurel."

Papilio cresphontes. Cram.

1833. Larva. *Boisduval—Leconte.* Hist. Lep. N. Amer., p. 31, pl. 12, 13, (as P. thoas.)
1836. Larva, chrys. *Boisduval.* Spec. Gener. Diurnæ, vol. 1, p. 356.
1859. Larva. *P. H. Gosse,* (quotes Bois.) Letters from Alabama, p. 170, (as P. thoas.)
1862. Larva. *Morris,* (quotes Bois.-Lec.) Synop. Lep. N. Amer., p. 8.
1877. Larva. *G. H. French.* Trans. Dept. Agr. Ill., vol. 15, p. 140.
1878. Larva, chrysalis. *Saunders.* Rept. Entom. Soc. Ontario, p. 61.
1878. Larva. *J. Boll.* Canad. Entom., vol. 10, p. 154.
1880. Larval stages. *G. H French.* 6th Ann. Rept. S. Ill. Normal Univ., p. 43.
1880. Larva. *Saunders.* Rept. Entom. Soc. Ontario, p. 41.
1880. Larva. *W. H. Ashmead.* Insects Injurious to the Orange, p. 47.
1880. Larva. *Miss N. Middleton.* Trans. Dept. Agr. Ill., vol. 18, p. 75.
1881. Larva, chrys. *Gundlach.* Entom. Cubana, p. 132.
1881. Life history. *G. H. French.* Canad. Entom., vol. 13, p. 177.
1883. Egg, young larva. *Saunders.* Canad. Entom., vol. 15, p. 234.
1883. Larva. *A. H. Mundt.* Papilio, vol. 3, p. 26.
1883. Larva, chrysalis, (brief.) *N. Coleman.* Papilio, vol. 3, p. 43.
1883. Life hist., (brief) (figs.) *Saunders.* Ins. Injur. to Fruits, p. 377.
1885. Larva, chrys., (col'd figs.) *Hubbard.* Ins. Affect. Orange, p. 137.
1886. Life history, (condensed.) *G. H. French.* Butt. East. U. States, p. 103.

FOOD PLANTS. *Ptelea, Dictamnus, Citrus, etc.*

Papilio polydamas. L.

1836. Larva. *Boisduval.* Spec. Gener. Diurnæ, vol. 1, p. 321.
1861. Larva. *Morris,* (quotes Boisduval.) Synop. Lep. N. Amer., p. 13.
1864. Larva. *Jaeger.* Life N. Amer. Ins., p. 210.
1878. Larva, chrys., (figs.) *H. Dewitz.* Wiegemann Archiv. Naturgesch., p. 2, fig. 1.
1878. Larva, chrys. *Dewitz.* Zeitsch. gesament. natur.
1879. Larva, chrys. *Dewitz.* Zeitsch. gesament. natur.
1881. Larva, chrys. *Gundlach.* Entom. Cubana, p. 121.

FOOD PLANT. *Aristolochia.*

Parnassius clodius. Men.

1879. Egg, young larva. *W. H. Edwards,* (as P. Baldur.) Canad. Entom., vol. 11, p. 142.
1885. Egg, young larva. *W. H. Edwards.* Canad. Entom., vol. 17, p. 64.
1886. Egg, larva. *H. J. Elwes,* (quotes Edw.) Proc. Zoöl. Soc. London, Jan., p. 51.

FOOD PLANTS. *Sedum, Saxifraga.*

Parnassius smintheus. Dby. and Hew.

1872. Egg, (col'd figs.) *W. H. Edwards.* Butt. N. Amer., 1st series, pl. 3 of Parnassius.
1875. Egg, young larva. *T. L. Mead.* Rept. on Lep. of Wheeler Exped'n. Geolog. Survey, vol. 5, p. 743.
1876. Egg, young larva. *W. H. Edwards.* Canad. Entom., vol. 11, p. 141.
1883. Egg, larva. *W. H. Edwards.* Papilio, vol. 3, p. 158.
1885. Life history. *W. H. Edwards.* Canad. Entom., vol. 17, p. 61.
1886. Egg, young larva. *H. J. Elwes,* (quotes Edw.) Proc. Zoöl. Soc. London, p. 23.

FOOD PLANTS. *Sedum, Saxifraga.*

Parnassius behrii. Edw.

1878. Larval stages. *T. L. Mead.* Psyche, vol. 2, p. 181.

FOOD PLANT. *Sedum.*

Neophasia menapia. Felder.

1873. Chrysalis. *Hy. Edwards.* Proc. Cal. Acad. Sc. vol. 5, p. 165.
1882. Egg, larva. *R. H. Stretch.* Papilio, vol. 2, p. 103.

FOOD PLANTS. *Pinus ponderosa, P. contorta, Abies balsamii.*

Pieris monuste. L.

1833. Larva. *Boisduval—Leconte.* Hist. Lep. N. Amer., p. 43, pl. 16.
1836. Larva, chrys. *Boisduval.* Spec. Gener. Diurnæ, vol. 1, p. 497.
1861. Larva, chrysalis. *Morris,* (quotes Bois. and Lec.) Synop. Lep. N. Amer., p. 17.
1881. Larva, chrys. *Gundlach.* Entom. Cubana, p. 101.
1883. Egg, larva, chrys., (fig.) *Riley.* Rept. U. S. Dept. Agr., pp. 117–118, pl. 10, fig. 1.
1886. Egg, larva, chrysalis. *G. H. French.* Butt. East. U. States, p. 107.

FOOD PLANTS. Species of *Cruciferæ.*

Pieris beckeri. Edw.

1878. Larva, chrysalis. *T. L. Mead.* Psyche, vol. 2, p. 183.
1883. Life hist., (col'd figs.) *W. H. Edwards.* Butt. N. Amer., 2d series, pt. 11, pl. 1 of Pieris.

FOOD PLANTS. Various species of *Cruciferæ.*

Pieris sisymbrii. Bdv.

1878. Larva. *T. L. Mead.* Psyche, vol. 2, p. 184.
1883. Life hist., (col'd figs.) *W. H. Edwards.* Butt. N. Amer., 2d series, pt. 11, pl. 1 of Pieris.

FOOD PLANTS. Species of *Cruciferæ.*

Pieris protodice. Bois.-Lec.

1870. Life hist., (figs.) *C. V. Riley.* 2d Missouri Rept., p. 104.
1870. Larva, chrysalis, (fig'd.) *Townend Glover.* Rept. U. S. Dept. Agr., p. 79.

1870. Larva, chrys. *C. I. Minot.* Amer. Entom. vol. 2, p. 77.
1871. Larva, chrysalis, (fig'd.) *Bethune.* Rept. Entom. Soc. Ontario, p. 425.
1873. Life hist. *Saunders.* Canad. Entom., vol. 5, p. 43.
1874. Larva, chrys. *Hy. Edwards,* (quotes C. I. Minot.) Proc. Cal. Acad. Sci., vol. 5, p. 327.
1877. Larva, chrysalis, (fig'd.) *G. H. French.* Trans. Dept. Agr. Ill., vol. 15, p. 141.
1877. Larva, chrysalis, (figs.) *Packard.* Inj. Ins. West, Hayden's Rept., p. 750.
1879. Larval stages, (figs.) *Cyrus Thomas.* Trans. Dept. Agr. Ill., vol. 17, Appendix, p. 25.
1880. Larva, (fig'd.) *Miss N. Middleton.* Trans. Dept. Agr. Ill., vol. 18, Appendix, p. 77.
1880. Larva, (fig'd.) *D. W. Coquillett,* (quotes Riley.) Trans. Dept. Agr. Ill., vol. 18, p. 178, App.
1882. Larva, chrysalis, (fig'd.) *Scudder.* Butt., their structure, etc., p. 21.
1882. Larva. *Saunders.* Canad. Entom., vol. 14, p. 1.
1882. Larva, (fig'd.) *Saunders.* Rept. Entom. Soc. Ontario, p. 14.
1883. Egg, larva, chrys., (figs.) *Riley.* Rept. U. S. Dept. Agr., pp. 114–115; pl. 10, figs. 2–4.
1886. Life history, (condensed) (figs.) *G. H. French.* Butt. East. U. States, p. 109.

FOOD PLANTS. Species of *Cruciferæ*, especially *Brassica*.

Pieris napi. Esper.

1828. Larva, chrys. *Stephens.* Illust. Brit. Entom., Haust., vol. 1, p. 20.
1836. Larva, chrys. *Boisduval.* Spec. Gener. Diurnæ, vol. 1, p. 519.
1859. Larva, chrys. *Edw. Newman.* Butt. Young England, p. 5.
1886. Life history, (figs.) *French.* Butt. East. U. States, p. 11.

FOOD PLANTS. Species of *Cruciferæ*.

Pieris oleracea. Harris.

1829. Larva. *Harris.* New England Farmer, vol. 7, p. 402. (Entom. Corres., p. 361, pl. 4.)
1841. Larva, chrys. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 214.
1850. Larva. *Harris.* Agassiz' Lake Superior, p. 386.
1852. Life history, (brief.) *Harris.* Ins. Inj. Vegetat., 2d edit., p. 233.
1854. Larva. *Emmons.* Natural Hist. N. York. Agriculture, vol. 5, p. 205.
1857. Egg, larva, (brief.) *Anonymous.* Canad. Nat. and Geolog., vol. 2, p. 347.
1862. Egg, larva, chrysalis. *Harris* Ins. Inj. Vegetat., Flint's edit., p. 270.
1864. Larva, chrysalis. *Lintner.* Proc. Entom. Soc. Phila , vol. 3, p. 54.
1869. Life history. *Fitch.* 13th Rept. Ins. N. Y., p. 531.
1869. Chrysalis, (fig.) *Harris.* Entom. Corres., pl. 4.
1870. Larva, chrysalis, (fig'd.) *Townend Glover.* Rept. U. S. Dept. Agr., p. 79.
1870. Larva, chrysalis, (figs.) *C. V. Riley.* 2d Missouri Rept., p. 105.
1871. Larva, chrysalis, (figs.) *Bethune.* Rept. Entom. Soc. Ontario, p. 424.
1873. Life history, (fig'd.) *Saunders.* Canad. Entom., vol. 5, p. 37.
1877. Egg, larva, (figs.) *Packard.* Inj. Ins. West, Hayden's Rept., p. 746.
1877. Larva, (fig'd.) *Packard.* Half Hours with Insects, p. 52.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 143.
1880. Larva, (fig'd.) *Miss N. Middleton.* Trans. Dept. Agr. Ill., vol. 18, p. 77, App.
1881. Egg, chrysalis, (figs.) *Scudder,* (after Riley.) Butterflies, their structure, etc., p. 165.
1883. Egg, larva, (fig'd.) *Riley.* U. S. Agr. Rept., p. 108, pl. 1.
1884. Egg, larva, chrysalis, (figs.) *Fernald.* Butt. of Maine, p. 25.

FOOD PLANTS. Species of *Cruciferæ*.

Pieris rapæ. L.

1828. Larva, chrys., (brief.) *Stephens.* Ill. Brit. Entom., Haust., vol. 1, p. 19.
1836. Larva, chrys. *Boisduval.* Spec. Gener. Diurnæ, vol 1, p. 520.
1837. Larva, chrys. *Kollar.* Inj. Insects (London's edit.), p. 150.
1842. Larva, chrys., (figs.) *Curtis.* Jour. Royal Agr. Soc. England, p. 312.
1856. Larva, chrys. *Chenu—Lucas.* Encyc. Natur. Papillons, p. 50.

1859. Larva, chrys. *Edw. Newman.* Butt. Young England, p. 5.
1869. Life history. *Fitch.* 13th Rept. Ins. N. York, p. 543.
1870. Larva, chrys., (figs.) *T. Glover.* Rept. U. S. Dept. Agr., p. 78, fig. 38.
1870. Life history, (figs.) *C. V. Riley.* 2d Missouri Rept., p. 106.
1871. Larva, (fig.) *Bethune.* Rept. Entom. Soc. Ontario, p. 423.
1872. Larva, chrysalis, (figs.) *Townend Glover.* Rept. Entom. N. York State Agr. Assoc., p. 82, fig. 15.
1873. Larva, (fig'd.) *A. J. Cook.* 12th Rept. Michigan Board Agr., p. 120, fig. 16.
1873. Life history. *Saunders.* Canad. Entom., vol. 5, p. 42.
1875. Egg, larva, chrysalis, (figs.) *Saunders.* Rept. Entom. Soc. Ontario, p. 31.
1877. Larva, chrysalis. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 145.
1877. Larva, chrysalis, (figs.) *Packard.* Inj. Ins. West, Hayden's Rept., p. 747.
1877. Larva, (fig'd.) *Packard.* Half Hours with Insects, p. 54.
1878. Egg, larva, chrysalis, (fig'd.) *J. Stauffer.* Agr. Pennsylv.
1879. Larva, (fig'd.) *Hiram Cutting.* Pests of Farmer, New Hampshire Board Agr., p. 34.
1879. Larval stages. *Cyrus Thomas,* (quotes Curtis and others.) Trans. Dept. Agr. Ill., vol. 17, pp. 10–25.
1880. Larva, chrysalis, (fig'd.) *Miss N. Middleton.* Trans. Dept. Agr. Ill., vol. 18, p. 77, App.
1880. Larva, (fig.) *D. W. Coquillett.* Trans. Dept. Agr. Ill., vol. 18, p. 179, App.
1881. Larva, chrysalis, (fig'd.) *Scudder,* (after Riley.) Butt., their structure, etc., p. 124, fig. 112.
1882. Larva and chrysalis. *Saunders.* Canad. Entom., vol. 14, p. 2.
1882. Larva, chrysalis, (brief.) *W. F. Kirby.* European Butt. and Moths, p. 8.
1883. Egg, larva, chrys., (figs.) *Riley.* Rept. U S. Dept. Agr., pp. 108–113, pl. 1, figs. 1–1d.
1884. Egg, larva, chrysalis. *Fernald.* Butt. of Maine, p. 27.
1885. Chrysalis, (fig.) *Hy. Edwards.* Standard Nat. Hist., vol. 2, p. 495.
1886. Life history, (figs.) *French.* Butt. East. U. States, p. 115.
1887. Larva. *J. Fletcher.* Rept. Ent. Dept. Agr. Canada, p. 16.
1888. Larva, (brief.) *J. Fletcher.* Rept. Ent. Bot. Dept. Agr. Canada, p. 16.

FOOD PLANTS. Species of *Cruciferæ.*

Pieris occidentalis. Reakt.

1888. Chrysalis. *Hy. Edwards.* Entom. Amer., vol. 3, p. 162.

Anthocharis lanceolata. Bdv.

1878. Larva. *T. L. Mead.* Psyche, vol. 2, p. 183.

FOOD PLANT. *Turritis glabra.*

Anthocharis ausoniedes. Bdv.

1874. Larva. *Hy. Edwards,* (quotes T. L. Mead in lit.) Proc. Cal. Acad. Sc., vol. 5, p. 326.
1874. Egg, larva, chrysalis, (col'd figs.) *W. H. Edwards,* (quotes T. L. Mead in lit.) Butt. N. Amer., 2d series, pl. 2 of Anthocharis.
1885. Larva, chrysalis. *W. H. Edwards.* Butt. of N. Amer., 2d series, pl. 13.

FOOD PLANTS. Species of *Cruciferæ.*

Anthocharis hyantis. Edw.

1878. Larva. *T. L. Mead.* Psyche, vol. 2, p. 183.

Callidryas eubule. L.

1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, pl. 5.
1833. Larva, (col'd fig.) *Boisduval—Leconte.* Hist. Lep. N. Amer., p. 74, pl. 24.
1836. Larva, chrysalis, (col'd figs.) *Boisduval.* Spec. Gener. Diurnæ, vol. 1, pp. 614–615, pl. 2.
1842. Larva, (col'd fig.) *Duncan.* Natural. Libr., vol. 21, p. 123.
1862. Larva. *Morris,* (quotes Boisd.) Synop. Lep. N. Amer., p. 26.
1873. Larva, (brief.) *Butler,* (quotes Abb.–Sm.) Monogr. Callidryas, p. 14.
1881. Larva, chrysalis. *Gundlach.* Entom. Cubana, p. 115.

FOOD PLANT. *Cassia.*

Callidryas sennæ. L.

1725. Larva, chrysalis. *Sloan.* Hist. Jamaica, p. 212.
1832. Larva, chrysalis, (col'd figs.) *Poey.* Cent. Lep. Cubana.
1855. Larva, chrysalis. *Sepp.* Surinamsche Vluiders, 1, p. 19, (as Pap. Hyperici.)
1873. Larva, chrysalis. *Butler,* (quotes Sloan.) Monogr. Callidryas, p. 17.
1873. Larva, chrysalis. *Butler,* (quotes Sepp.) Monogr. Callidryas, p. 16.
1886. Larva, (brief.) *French.* Butt. East. U. States, p. 123.

FOOD PLANT. *Cassia.*

Callidryas philea. L.

1873. Larva, chrysalis, (brief.) *Butler.* Monogr. Callidryas, p. 22.
1888. Chrysalis. *Hy. Edwards.* Entom. Amer., vol. 3, p. 162.

Colias eurydice. Bdv.

1876. Larva, chrysalis. *Hy. Edwards.* Proc. Cal. Acad. Sc., vol. 7, p. 61.
1883. Life history. *W. H. Edwards.* Canad. Entom., vol. 15, p. 224.

FOOD PLANT. *Amorpha californica.*

Colias cæsonia. Stoll.

1833. Larva. *Boisduval—Leconte.* Hist. Lep. N. Amer., p. 67, pl. 22.
1836. Larva. *Boisduval.* Spec. Gener. Diurnæ, vol. 1, p. 636.
1862. Larva. *Morris,* (quotes Bois.-Lec.) Synop. Lep. N. Amer., p. 27.
1874. Larva. *Hy. Edwards,* (quotes Boisduval.) Proc. Cal. Acad. Sc., vol. 5, p. 327.
1880. Larva. *Miss N. Middleton.* Trans. Dept. Agr. Ill., vol. 18, p. 78, App.
1881. Larva, chrysalis. *Gundlach.* Entom. Cubana, p. 106.
1886. Larva, (brief.) *French.* Butt. East. U. States, p. 128.
1888. Life history. *W. H. Edwards.* Canad. Entom., vol. 20, p. 21.

FOOD PLANTS. *Trifolium, Amorpha.*

Colias meadii. Edw.

1889. Life history. *W. H. Edwards.* Canad. Entom., vol. 21, p. 41.

Colias eurytheme. Bdv.

1869. Egg, larva, chrysalis. *W. H. Edwards,* (quotes J. K. Hayhurst.) Butt. N. Amer., 2d series, Colias No. 3.
1872. Egg, larva, chrysalis. *W. H. Edwards.* Supplem. Notes to Butt. N. Amer.
1878. Egg, larval stages, (figs.) *W. H. Edwards.* Butt. N. Amer., 2d series, Colias No. 4.
1880. Larva. *Miss N. Middleton.* Trans. Dept. Agr. Ill., vol. 18, p. 78, App.
1886. Life history, (condensed.) *G. H. French.* Butt. East. U. States, p. 131.

FOOD PLANT. *Trifolium.*

Colias hagenii. Edw.

1883. Life history. *W. H. Edwards.* Papilio, vol. 3, p. 163.

FOOD PLANT. *Trifolium.*

Colias philodice. Godt.

1857. Larva, (brief). *Anonymous.* Canad. Nat. and Geolog., vol. 2, p. 318.
1862. Larva, chrysalis, (fig'd.) *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 272.
1869. Egg. *Saunders.* Canad. Entom., vol. 1, p. 54.
1870. Larva. *Riley.* 2d Missouri Rept., p. 116.
1870. Larva, chrysalis. *Saunders.* Canad. Entom., vol. 1, p. 55.
1873. Larva, chrysalis. *Saunders.* Canad. Entom., vol. 5, p. 222.
1874. Egg, larva, chrysalis. *Saunders.* Rept. Entom. Soc. Ontario, p. 27.
1876. Life history, (col'd figs.) *W. H. Edwards.* Butt. N. Amer., 2d series, Colias No. 3.
1880. Larva. *Miss N. Middleton.* Trans. Dept. Agr. Ill., vol. 18, p. 78, App.
1881. Egg, larva, chrysalis, (figs.) *Scudder.* Butt., their structure, etc., pp. 8, 42, 116.
1882. Life history, (brief.) *Saunders.* 12th Rept. Entom. Soc. Ontario, p. 48.

1884. Egg, larva, chrysalis. *Fernald.* Butt. of Maine, p. 31.
1886. Life history, (condensed.) *French.* Butt. East. U. States, p. 134.
FOOD PLANTS. *Trifolium, Astragalus.*

Colias scudderii. Reak.
1872. Young larva. *W. H. Edwards.* Butt. N. Amer., Colias, No. 8.

Colias alexandra. Edw.
1872. Egg. *W. H. Edwards.* Butt. N. Amer., Supplementary part.

Colias harfordii. (incl. C. Barbara ♀.)
1884. Life history. *W. H. Edwards.* Papilio, vol. 4, p. 2.
FOOD PLANT. *Astragalus crotalaria.*

Terias nicippe. Cram.
1833. Larva, (col'd fig.) *Titian Peale.* Lep. Amer., pl. 8.
1833. Larva. *Boisduval—Leconte.* Hist. Lep. N. Amer., p. 55, pl. 20.
1836. Larva, chrysalis. *Boisduval.* Spec. Gener. Diurnæ, vol. 1, p. 654.
1855. Larva, chrysalis. *Townend Glover.* Trans. N. York State Agr. Soc., p. 105.
1856. Larva, chrysalis. *Chenu—Lucas.* Entom. Nat. Hist. Papillons, p. 60.
1862. Larva, chrysalis. *Morris,* (quotes Bois.-Lec.) Synop. Lep. N. Amer., p. 33.
1873. Chrysalis. *Hy. Edwards,* (quotes Bois.-Lec.) Proc. Cal. Acad. Sc. vol. 5, p. 166.
1880. Larva. *Miss N. Middleton,* (quotes Bois.-Lec.) Trans. Dept. Agr. Ill., vol. 18, p. 79, App.
1881. Larva, chrysalis. *Gundlach.* Entom. Cubana, p. 83.
1881. Life history. *W. H. Edwards.* Canad. Entom., vol. 13, p. 61.
1881. Chrysalis. *Scudder.* Butt., their structure, etc., p. 184.
1886. Larva, chrysalis. *French.* Butt. East. U. States, p. 137.
FOOD PLANT. *Cassia.*

Terias lisa. Bdv.
1833. Larva, chrysalis, (col'd fig.) *Bois.-Lec.* Hist. Lep. N. Amer., p. 53, pl. 19.
1836. Larva, chrysalis, (col'd fig.) *Boisduval.* Spec. Gener. Rhopaloc., vol. 1, pl. 2, p. 662.
1862. Larva. *Morris.* Synop. Lep. N. Amer., p. 34.
1874. Larva, chrys, (brief.) *Hy. Edwards,* (quotes Boisduval.) Proc. Cal. Acad. Sc., vol. 5, p. 327.
1880. Larva. *Miss Middleton,* (quotes Boisd.) Trans. Dept. Agr. Ill., vol. 18, p. 79, Append.
1886. Larva, (brief.) *French.* Butt. East. U. States, p. 139.
FOOD PLANTS. *Cassia, Trifolium.*

Terias delia. Cram.
1883. Larva. *Bois.-Lec.* Hist. Lep. N. Amer., p. 49, pl. 18.
1836. Larva, chrysalis. *Boisduval.* Spec. Gener. Diurnæ, vol. 1, p. 664.
1862. Larva. *Morris,* (quotes Bois.) Synop. Lep. N. Amer., p. 35.
1874. Larva, chrys, (brief.) *Hy. Edwards,* (quotes Boisduval.) Proc. Cal. Acad. Sc., vol. 5, p. 327.
1886. Larva, (brief.) *French.* Butt. East. U. States, p. 140.
FOOD PLANTS. *Cassia, Trifolium.*

Heliconia charitonia. L.
1850. Larva. *P. H. Gosse.* Note in Doubleday. Gen. Diur. Lep., vol. 1, p. 97.
1879. Larva, chrysalis. *Dewitz.* Zeitsch. gesament. natur.
1881. Larva. *W. H. Edwards.* Papilio, vol. 1, p. 209.
1881. Larva. *W. H. Edwards.* Canad. Entom., vol. 13, p. 158.
1881. Larva, chrysalis. *Gundlach.* Entom. Cubana, p. 21.
1882. Life history. *W. H. Edwards.* Butt. N. Amer., 2d series, part 10.
1886. Life history, (condensed.) *French.* Butt. East. U. States, p. 142.
FOOD PLANT. *Passiflora.*

Danais archippus. Latr.

1797. Larva, chrysalis, (col'd figs.) *Abbot—Smith.* Lep. Ins. Georgia, pl. 6.
1828. Larva, chrys., (fig.) *Say.* Amer. Entom., vol. 3, pl. 54.
1833. Larva, (col'd figs.) *T. Peale.* Lep. Americana, pl. 7.
1833. Larva, chrys., (col'd figs.) *Bois.-Lec.* Hist. Lep. N. Amer., p. 137, pl. 40.
1840. Larva, chrys., (figs.) *Westwood.* Intr. Mod. Class. Ins., vol. 2, p. 352
1854. Larva, chrys., (col'd figs.) *Emmons.* Nat. Hist. N. York, vol. 5, pl. 38.
1857. Larva, chrys., (fig.) *Anon.* Canad. Nat. and Geol., vol. 2, p. 351.
1859. Larva, chrys. *P. H. Gosse.* Letters from Alabama, p. 185.
1862. Larva, chrys. *Morris,* (quotes Bois.-Lec.) Synop. Lep. N. Amer., p. 38.
1862. Larva, pupa. *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 280.
1869. Larva, chrysalis. *Saunders.* Canad. Entom., vol. 1, p. 75.
1870. Egg, chrysalis. *Saunders.* Canad. Entom., vol. 2, p. 148.
1871. Life history, (figs.) *Riley.* 3d Missouri Rept., p. 144.
1873. Larva, chrysalis. *Hy. Edwards.* Proc. Cal. Acad. Sc., vol. 5, p. 166.
1873. Life history. *Saunders.* Canad. Entom., vol. 5, p. 4.
1876. Life history, (brief.) *W. H. Edwards.* Canad. Entom., vol. 8, p. 119.
1878. Life history. *W. H. Edwards.* Psyche, vol. 2, p. 176.
1878. Larva, chrys. *H. Dewitz.* Wiegemann Archiv. Naturgesch., p. 9, pl. 1.
1878. Larva, chrysalis. *Dewitz.* Zeitsch. gesament. natur.
1879. Larva, chrys., (figs.) *Mrs. I. P. Ballard.* Insect Lives, p. 24.
1879. Larva, chrys. *Dewitz.* Zeitsch. gesament. natur.
1880. Larva, (fig.) *D. Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 161.
1880. Larva, (fig.) *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 80.
1881. Larva, chrys. *Gundlach.* Entom. Cubana, p. 23.
1881. Egg, larva, (figs.) *Scudder.* Butt., their structure, etc., pp. 10, 18, figs. 17, 18, 22.
1881. Chrysalis, (fig.) *Scudder.* Loc. cit., p. 44, fig. 61.
1884. Egg, larva, chrysalis, (figs.) *Fernald.* Butt. Maine, p. 35.
1885. Larva, chrys. *Hy. Edwards.* Kingsley's Stand. Nat. Hist., vol. 2, p. 492.
1886. Life history, (condensed,) (figs.) *French.* Butt. East. U. States, p. 144.
1888. Chrysalis, (fig.) *Grote.* 18th Rept. Entom. Soc. Ontario, p. 74.
1888. Larval stages, (fig.) *Lintner.* 4th Rept. N. Y. State Entom., p. 136.

FOOD PLANT. *Asclepias.*

Danais berenice. Cram.

1833. Larva, chrys., (figs.) *Bois.-Lec.* Hist. Lep. N. Amer., p. 134, pl. 39.
1862. Larva, chrys. *Morris,* (quotes Bois.-Lec.) Synop. N. Amer. Lep., p. 37.
1874. Larva, chrys. *Hy. Edwards,* (quotes Boisduval.) Proc. Cal. Acad Sc., vol. 5, p. 327.
1881. Larva, chrys. *Gundlach.* Entom. Cubana, p. 25.
1886. Larva, chrys. *French.* Butt. East. U. States, p. 146

FOOD PLANTS. *Nerium, Asclepias.*

Agraulis vanillæ. Cr.

1769. Larva, chrys. *Abbot—Smith.* Lep. Ins. Georgia, pl. 12.
1833. Larva, chrys., (figs.) *Bois.-Lec.* Hist. Lep. N. Amer., p. 143, pl. 42.
1855. Larva, chrysalis. *Townend Glover.* Trans. N. York State Agr. Soc., p. 106.
1862. Larva, chrysalis. *Morris,* (quotes Bois.-Lec.) Synop. Lep. N. Amer., pp. 40, 41.
1874. Larva, chrys. *Hy. Edwards,* (quotes Boisduval.) Proc. Cal. Acad. Sc., vol. 5, p. 327.
1880. Larva. *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, App , p. 80.
1880. Life history. *W. H. Edwards.* Canad. Entom., vol. 12, p. 122.
1881. Larva, chrys. *Gundlach.* Entom. Cubana, p. 57.
1886. Life history, (condensed.) *French.* Butt. East. U. States, p. 148.

FOOD PLANT. *Passiflora.*

Argynnis, idalia. Drury.

1875. Egg, young larva. *W. H. Edwards.* Canad. Entom., vol. 7, p. 151.
1879. Life history, (brief.) *W. H. Edwards.* Canad. Entom., vol. 11, p. 217.
1880. Larva. *Coquillett,* (quotes Edw.) Trans. Dept. Agr. Ill., vol. 18, Append., p. 162.
1880. Larva. *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 81.
1884. Egg, larva. *Fernald.* Butt. Maine, p. 37.
1886. Life history, (condensed.) *French.* Butt. East. U. States, p. 150.

Argynnis diana. Cram.

1872. Egg, (brief.) *W. H. Edwards.* Butt. N. Amer., Supplementary part.
1874. Larva. *W. H. Edwards.* Canad. Entom., vol. 6, p. 121.
1876. Life history, (col'd figs.) *W. H. Edwards.* Butt. N. Amer., 2d series, pl. 7 of Argynnis.
1880. Larva. *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 81.
1886. Life history, (condensed.) *French.* Butt. East. U. States, p. 153.

Argynnis cybele. F.

1872. Egg. *W. H. Edwards.* Butt. N. Amer., supp. part.
1872. Larva, chrysalis. *Saunders.* Canad. Entom., vol. 4, p. 121.
1874. Larva. *W. H. Edwards.* Canad. Entom., vol. 6, p. 121.
1876. Life history. *W. H. Edwards.* Butt. N. Amer , 2d series, pl. Argynnis, No. 7.
1880. Larva. *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 81.
1880. Life history. *W. H. Edwards.* Canad. Entom., vol. 12, p. 141.
1886. Life history, (condensed.) *French.* Butt. East. U. States, p. 155.

Argynnis aphrodite. F.

1868. Larva, (brief.) *W. H. Edwards,* (quotes D. W. Beadle in lit.) Butt. N. Amer., 1st series, pl. Argynnis, No. 3.
1874. Larva. *W. H. Edwards.* Canad. Entom., vol. 6, p. 121.
1876. Life history. *W. H. Edwards.* Butt. N. Amer., 2d series, pl. Argynnis, No. 7.
1880. Larva. *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 81.

Argynnis hesperis. W. H. Edwards.

1888. Life history. *W. H. Edwards.* Canad. Entom., vol. 20, p. 67.

Argynnis edwardsii. Reakirt.

1888. Life history. *W. H. Edwards.* Canad. Entom., vol. 20, p. 3.

Argynnis alcestis. Edw.

1879. Life history. *W. H. Edwards.* Canad. Entom., vol. 12, p. 69.
1880. Larva. *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 82.
1886. Life history. *French.* Butt. East. U. States, p. 159.

Argynnis atlantis. Edw.

1868. Larva. (brief.) *W. H. Edwards,* (quotes C. H. Shurtleff in lit.) Butt. N. Amer., pl. Argynnis, No. 5.
1869. Larva, chrysalis. *Packard.* Guide to Study of Ins., p. 252.
1880. Larva. *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 82.
1881. Chrysalis, (fig.) *Scudder.* Butt., their structure, etc., p. 150.
1886. Chrysalis, (fig.) *French.* Butt. East. U. States, p. 161.
1888. Life history. *W. H. Edwards.* Canad. Entom., vol. 20, p. 3.

Argynnis eurynome. Edw.

1875. Egg, (col'd fig.) *W. H. Edwards.* Butt. N. Amer., 2d series, pl. Argynnis, No. 1.

Argynnis egleis. Bois.

1879. Larva. *W. H. Edwards.* Canad. Entom., vol. 11, p. 53.
1879. Life history. *W. H. Edwards.* Canad. Entom., vol. 11, p. 177.
1880. Larva. *D. W. Coquillett,* (quotes Edwards.) Trans. Dept. Agr. Ill., vol. 18, Append., p. 164.

Argynnis myrina. Cram.

1869. Life history. *Saunders.* Canad. Entom., vol. 1, p. 55.
1869. Larva, chrysalis. *Packard,* (quotes Saunders.) Guide to Study of Ins., p. 254.
1874. Larva, chrys. *Hy. Edwards,* (quotes Saunders.) Proc. Cal. Acad. Sc., vol. 5, p. 328.
1875. Life history. *W. H. Edwards.* Canad. Entom., vol. 7, p. 189.
1876. Life history, (additional notes.) *W. H. Edwards.* Canad. Entom., vol. 8, p. 161.
1880. Larva. *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 82.
1880. Larva. *D. W. Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 161.
1881. Egg, (fig.) *Scudder.* Butt., their structure, etc., p. 8.
1884. Larval stages, (fig.) *Gruber.* Jena Zeitschr. Nat., copied in Papilio, vol. 4, p. 91.
1884. Egg, larva, chrysalis, (figs.) *Fernald.* Butt. Maine, p. 41.
1886. Egg, larva, chrysalis, (figs.) *French.* Butt. East. U. States, p. 162.

Argynnis montinus. Scud.

1874. Life history, (figs.) *Scudder.* Geology N. Hampsh., pl. A.

Argynis bellona. Fab.

1871. Egg. *Scudder.* Rept. Peabody Acad. Sc., p. 49.
1872. Life history. *Scudder.* Amer. Naturalist, vol. 6, p. 513.
1880. Life history, (notes on.) *W. H. Edwards.* Papilio, vol. 1, p. 134.
1880. Larva. *Miss Middleton.* Trans. Dept. Agr. Ill., vol 18, Append., p. 83.
1880. Larva. *D. W. Coquillett.* Trans. Dept. Agr. Ill., vol 18, Append., p. 183.
1884. Larva. *Fernald.* Butt. Maine, p. 41.
1888. Chrysalis. *Hy. Edwards.* Entom. Amer. vol. 3, p. 162.

FOOD PLANTS (of all the species of Argynnis). *Viola* of various species.

Euptoieta claudia. Cram.

1833. Larva, chrysalis, (figs.) *Bois.-Lec.* Hist. Lep. N. Amer., p. 153, pl. 44.
1855. Larva, chrysalis. *Townend Glover.* Trans. N. Y. State Agr. Soc., p. 105.
1862. Larva, chrysalis. *Morris,* (quotes Bois.-Lec.) Synop. Lep. N. Amer., p. 44.
1870. Larva. *W. H. Edwards.* Canad. Entom., vol. 2, p. 163.
1875. Egg, larva. *T. L. Mead.* Rept. Lepid. Wheeler Survey, vol. 5, p. 751.
1880. Larva. *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 80.
1880. Life history. *W. H. Edwards.* Canad. Entom., vol. 12, p. 231.
1884. Larva, chrysalis. *Fernald,* (quotes W. H. Edwards.) Butt. Maine, p. 43.
1886. Life history, (brief.) *French.* Butt. East. U. States, p. 166.

FOOD PLANTS. *Viola, Passiflora, Sedum, Desmodium, Portulaca.*

Melitæa phaeton. Drury.

1868. Larva, chrysalis, (figs.) *Packard.* Amer. Naturalist, vol. 2, p. 219.
1869. Egg, larval stages. *Lintner.* 23d Rept. N. York State Cab. Nat. Hist., pp. 154–157.
1871. Egg. *Scudder.* Rept. Peabody Acad. Sc., p. 51.
1875. Life history. *W. H. Edwards.* Canad. Entom., vol. 7, p. 150.
1875. Life history, (col'd figs.) *W. H. Edwards.* Butt. N. Amer., 2d series, pl. Melitæa, No. 1.
1877. Larva. *Scudder.* Psyche, vol. 1, p. 18.
1877. Larva, chrysalis, (col'd fig.) *Packard.* Half hours with Insects.
1880. Larva. *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 83.
1881. Egg, (fig.) *Scudder.* Butt., their structure etc., p. 9.
1881. Web and nest. *Scudder,* (quotes Edwards.) Butt., their structure, etc., p. 106.
1884. Larva—notes on. *W. H. Edwards.* Papilio, vol. 4, p. 68.
1884. Larval stages, (figs.) *Gruber.* Jena Zeitschr. Nat., p. 17, pl. 8.
84. Larval stages, (figs.) *Gruber.* Loc. cit. copied in Papilio, vol. 4, p. 87.
4. Egg, larva, chrysalis, (fig.) *Fernald.* Butt. Maine, p. 44.

1886. Life history, (figs.) *French.* Butt. East. U. States, p. 169.

FOOD PLANTS. *Chelonia glabra, Lonicera ciliata.*

Melitæa cooperi. Behr.

1863. Larva. *Behr.* Proc. Cal. Acad. Sc., vol. 3, p. 90.

Melitæa chalcedon. Doub.-Hew.

1863. Larva, chrysalis. *Behr.* Proc. Cal. Acad. Sc., vol. 3, p. 89.

1871. Larva, chrys., (col'd figs.) *W. H. Edwards.* Butt. N. Amer., pl. Melitæa, No. 1.

1873. Larva, chrysalis. *Hy. Edwards.* Proc. Cal. Acad. Sc., vol. 5, p. 167.

1883. Egg, larva. *W. G. Wright.* Papilio, vol. 3, p. 123.

1884. Larva and partial history. *W. H. Edwards.* Papilio, vol. 4, p. 63.

1885. Chrysalis. *Hy. Edwards.* Kingsley's Stand. N. Hist., vol. 2, p. 486.

FOOD PLANTS. *Mimulus, Castileja.*

Melitæa nubigena. Behr.

1875. Larva, chrysalis. *T. L. Mead.* Rept. Lep. Wheeler Survey, vol. 5, p. 758.

Melitæa baroni. Hy. Edw.

1879. Larval stages. *W. H. Edwards.* Canad. Entom., vol. 11, p. 149.

1879. Life history. *W. H. Edwards.* Canad. Entom., vol. 11, p. 129.

1880. Larva. *Coquillett,* (quotes Edwards.) Trans. Dept. Agr. Ill., vol. 18, Append., p. 163.

FOOD PLANTS. Species of *Scrophulariaceæ.*

Melitæa rubicunda. Hy. Edw.

1885. Larval stages. *W. H. Edwards.* Canad. Entom., vol. 17, p. 155.

FOOD PLANT. *Scrophularia.*

Melitæa editha. Bois.

1873. Larva, chrysalis. *Hy. Edwards.* Proc. Cal. Acad. Sc., vol. 5, p. 167.

FOOD PLANTS. *Erodium cicutarium, Trifolium, Viola.*

Melitæa palla. Bois.

1873. Larva, chrysalis. *Hy. Edwards.* Proc. Cal. Acad. Sc., vol. 5, p. 167.

FOOD PLANT. *Castelejia breviflora.*

Melitæa harrisii. Scud.

1877. Life history. *W. H. Edwards.* Canad. Entom., vol. 9, p. 165.

1877. Larva. *Scudder.* Psyche, vol. 1, p. 18.

1880. Larva. *Coquillett,* (quotes Edwards.) Trans. Dept. Agr. Ill., vol. 18, Append., p. 162.

1881. Chrysalis, (fig.) *Scudder.* Butt., their structure, etc., p. 32.

1884. Life history. *French.* Butt. East. U. States, p. 170.

1884. Larva, chrysalis, (figs.) *French.* Butt. East. U. States, p. 170.

FOOD PLANT. *Diplopappus umbellatus.*

Melitæa minuta. Edw.

1879. Chrysalis. *W. H. Edwards.* Canad. Entom., vol. 11, p. 141.

Melitæa ismeria. Bois.-Lec.

NOTE.—There is still some doubt as to this species. I therefore give the references to its early stages.

1833. Larva, chrysalis, (figs.) *Bois.-Lec.* Hist. Lep. N. Amer., p. 168, pl. 46.

1862. Larva, chrysalis. *Morris,* (quotes Bois.-Lec.) Synop. Lep. N. Am., p. 50.

Phyciodes nycteis. Doub.-Hew.

1869. Life history, (figs.) *Lintner.* 23d Rept. N. York State Cab. N. Hist., p. 158, pl. 8.

1870. Larva. *W. H. Edwards,* (as P. Harrisii.) Canad. Entom., vol. 2, p. 163.

1872. Egg. *Saunders,* (as M. Harrisii.) Canad. Entom., vol. 4, p. 161.

1872. Larval stages. *Saunders,* (as M. Harrisii.) Loc. cit., p. 162.

1872. Larva. *Lintner.* Entom. Contrib., No. 1, p. 26.

1873. Larva. *W. H. Edwards.* Canad. Entom., vol. 5, p. 224.

1874. Larva, chrysalis. *Riley.* Proc. Amer. Ass. Adv. Sc., p. 108.

1875. Larva, chrysalis. *W. H. Edwards.* Canad. Entom., vol. 7, p. 151.

1879. Life history. *W. H. Edwards.* Canad. Entom., vol. 11, p. 101.
1880. Larva. *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 83.
1880. Larva. *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 165.
1884. Life history. *Gruber.* Jena Zeitschr. Nat., vol. 17, p. 478, pl. 8. Copied in Papilio, vol. 4, p. 90.
1884. Life history, (brief.) *Fernald.* Butt. Maine, p. 46.
1886. Life history, (condensed.) *French.* Butt. East. U. States, p. 172.
FOOD PLANTS. Species of *Helianthus and Actinomeris.*

Phyciodes vesta. Edw.
1879. Life history. *W. H. Edwards.* Canad. Entom., vol. 2, p. 129.

Phyciodes camillus. Edw.
1884. Life history. *W. H. Edwards.* Papilio, vol. 4, p. 128.
FOOD PLANT. *Aster* of various species.

Phyciodes tharos. Drury. (incl. vars.)
1862. Chrysalis. *Harris.* Ins. Inj. Vegetat., Flint's ed., p. 290.
1875. Life history. *T. L. Mead.* Canad. Entom., vol. 7, p. 161.
1877. Life history. *W. H. Edwards.* Canad. Entom., vol. 9, pp. 1–51.
1878. Life history, (col'd figs.) *W. H. Edwards.* Butt. N. Amer., 2d series, pl. Phyciodes, No. 1.
1878. Life history, (figs.) *Gruber.* Jena Zeitschr. Nat., vol. 17, p. 477, pl. 8.
1880. Larva. *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append. p. 83.
1880. Larva. *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 163.
1884. Larval stages. *Gruber.* Jena Zeitschr. Nat., vol. 17, copied in Papilio, vol. 4, pp. 90–120.
1884. Egg, larva. *Fernald.* Butt. Maine, p. 48.
1886. Life history, (condensed.) *French.* Butt. East. U. States, p. 178.
FOOD PLANT. *Actinomeris helianthoides.*

Phyciodes mylitta. Edw.
1873. Larva, chrysalis. *Hy. Edwards.* Proc. Cal. Acad. Sc., vol. 5, p. 167.
1875. Larva, chrysalis. *T. L. Mead,* (quotes Hy. Edwards.) Rept. Lep. Wheeler Expd., vol. 5, p. 764.
FOOD PLANTS. *Carduus* (thistles) of various species.

Phyciodes picta. Edw.
1884. Life history. *W. H. Edwards.* Canad. Entom., vol. 16., p. 163.

Eresia texana. Edw.
1879. Larval stages, chrysalis. *W. H. Edwards.* Canad. Entom. vol. 11, p. 127.
1880. Larva. *Coquillett,* (quotes Edwards.) Trans. Dept. Agr. Ill., vol. 18, Append., p. 164.

Synchloe (Coatlantona) janais. Drury.
1883. Larva, chrysalis. *W. Schaus, jr.* Papilio, vol. 3, p. 188.
1888. Chrysalis. *Hy. Edwards.* Entom. Amer., vol. 3, p. 161.

Grapta interrogationis. Fab. (includ. vars.)
1833. Larva, chrysalis, (figs.) *Bois.-Lec.,* (as V. c-aureum.) Hist. Lepid. N. Amer., p. 192, pl. 51.
1840. Larva, chrysalis. *P. H. Gosse.* Canad. Naturalist, p. 280, (as G. c-aureum.)
1841. Larva, chrysalis. *Harris.* Inj. Ins. Vegetat., 1st edit., p. 220.
1852. Larva, chrysalis. *Harris.* Inj. Ins. Vegetat., 2d edit., p. 240.
1854. Larva, (col'd fig.) *Emmons.* Nat. Hist. N. York, vol. 5, pl. 35.
1862. Larva, chrysalis. *Harris.* Ins. Inj. Vegetat., Flint's ed., p. 300.
1862. Larva, chrysalis. *Morris,* (quotes Bois.-Lec.) Synop. Lep. N. Amer., p. 54.
1869. Larva. *Harris.* Entom. Corres., p. 280.
1869. Larva. *Saunders.* Canad. Entom., vol. 1, p. 76.

1871. Life history, (col'd figs.) *W. H. Edwards.* Butt. N. Amer., 2d series, pl. Grapta, Nos. 4, 5.
1877. Larva, chrysalis. *Packard.* Inj. Ins. West, Hayden Rept., p. 774.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 152.
1880. Larva. *Miss Middleton.* Trans. Dept. Agr., Ill., vol. 18, Append., p. 84.
1880. Larva. *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 164.
1881. Chrysalis, (fig.) *Scudder.* Butt., their structure, etc., p. 258.
1881. Larva, chyrsalis. *Packard,* (quotes Saunders.) Ins. Inj. to Forest Trees, p. 65.
1882. Life history. *W. H. Edwards.* Canad. Entom., vol. 14, p. 201.
1884. Egg, larva, chrysalis. *Fernald.* Butt. Maine, p. 49.
1886. Life history, (condensed.) *French.* Butt. East. U. States, p. 184.
1886. Chrysalis, (fig.) *French.* Butt. East. U. States, p. 184.

FOOD PLANTS. *Humulus, Ulmus, Urtica.*

Grapta comma. Harris, (incl. vars.)

1840. Larva, chrysalis. *P. H. Gosse.* Canad. Naturalist, pp. 221, 226, 280.
1841. Chrysalis. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 221.
1852. Larva, chrysalis. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 241.
1856. Larva. *Fitch.* 3d Rept. Ins. N. Y., p. 432.
1862. Larva, chrysalis. *W. H. Edwards.* Proc. Entom. Soc. Philad., vol, 1, p. 182.
1862. Chrysalis, (fig.) *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 301, pl. 4.
1862. Chrysalis. *Morris.* Synop. Lep. N. Amer., p. 54.
1864. Larva, chrysalis. *Lintner.* Proc. Entom. Soc. Philad., vol. 3, p. 55.
1871. Life history, (col'd figs.) *W. H. Edwards.* Butt. N. Amer., 2d series., pl. Grapta, No. 2.
1871. Larva, chrysalis, (col'd figs.) *W. H. Edwards,* (var. dryas.) Loc. cit., pl. Grapta, No. 3.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 152.
1877. Larva. *Packard.* Inj. Ins. West, Hayden's Rept., p. 774.
1880. Larva. *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 84.
1880. Larva. *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 163.
1881. Larva, chrysalis. *Packard,* (quotes W. H. Edwards.) Ins. Inj. Forest Trees, p. 66.
1881. Egg, (fig.) *Scudder.* Butt., their structure, etc., p. 99.
1882. Life history. *W. H. Edwards.* Canad. Entom., vol. 14, p. 189.
1884. Egg, larva, chrys. *Fernald.* Butt. Maine, p. 51.
1886. Life history. *French.* Butt. East. U. States, p. 186.

FOOD PLANTS. *Humulus, Ulmus, Urtica.*

Grapta satyrus. Edw.

1872. Larva, chrysalis, (col'd fig.) *W. H. Edwards,* (quotes Stretch M. S.) Butt. N. Amer., 2d series, pl. Grapta, No. 6.
1873. Larva. *Hy. Edwards,* (quotes Stretch, MS.) Proc. Cal. Acad. Sc., vol. 5, p. 168.
1873. Chrysalis. *Hy. Edwards.* Loc. cit., p. 168.
1875. Larva. *C. W. Pearson.* Canad. Entom., vol. 7, p. 216.

FOOD PLANT. *Urtica.*

Grapta rusticus. Edw.

1879. Larva, chrysalis, (col'd fig.) *W. H. Edwards.* Butt. N. Amer., 2d series, pl. Grapta, No. 3.

Grapta faunus. Edw.

1864. Larva, chrysalis. *Lintner.* Proc. Entom. Soc. Philad., vol. 3, p. 58.
1875. Larva. *Caulfield.* Canad. Entom., vol. 7, p. 49.
1880. Larva. *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 84.
1881. Chrysalis, (fig.) *Scudder.* Butt., their structure, etc., p. 42.
1884. Egg, larva. *Fernald.* Butt. Maine, p. 52.

1884. Chrysalis, (fig.) *Fernald.* Loc. cit., p. 52.
1886. Larva. *French.* Butt. East. U. States, p. 188.
1886. Chrysalis, (fig.) *French.* Loc. cit., p. 188.
FOOD PLANT. *Salix.*

Grapta silvius. Edw.

1873. Larva, chrysalis. *Hy. Edwards,* (as G. zephyrus in error.) Proc. Cal. Acad. Sc., vol. 5, p. 169.
FOOD PLANT. *Azalea occidentalis.*

Grapta zephyrus. Edw.

1879. Larva, chrysalis, (col'd fig.) *W. H. Edwards.* Butt. N. Amer., 2d series, pl. Grapta, No. 3.

Grapta progne. Cram.

1840. Larva, chrys. *P. H. Gosse.* Canad. Naturalist, p. 249, (as G. c-argenteum.)
1841. Larva, chrysalis. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 222.
1852. Larva, chrysalis. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 242.
1856. Larva, chrysalis. *Fitch.* 3d Rept. Ins. N. York, p. 430.
1862. Chrysalis. *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 301.
1869. Larva, (brief.) *Harris.* Entom. Corres., p. 280.
1871. Larva, chrysalis. *Le Baron.* 2d Illinois Rept., p. 59.
1871. Egg. *Scudder.* Rept. Peabody Acad. Sc., p. 34.
1871. Larva, (brief.) *Saunders.* Rept. Entom. Soc. Ontario, p. 376.
1880. Larva. *Miss Middleton.* Trans. Dept. Agr. Ill, vol. 18, Append., p. 85
1880. Life history. *W. H. Edwards.* Canad. Entom., vol. 12, p. 9.
1881. Larva. *Packard,* (quotes Fitch.) Ins. Inj. Forest Trees, p. 66.
1883. Larva, chrysalis. *Saunders.* Ins. Inj. Fruits, p. 347.
1884. Egg. larva, chrysalis. *Fernald.* Butt. Maine, p. 54.
1886. Life history. *French.* Butt. East. U. States, p. 191.
FOOD PLANT. *Ribes* of various species.

Grapta j. album. Bois.–Lec.

1864. Larva, chrysalis. *Lintner.* Proc. Entom. Soc. Philad., vol. 3, p. 58.
1884. Larva, chrysalis. *Fernald.* Butt. Maine, p. 55.
1886. Larva, chrysalis. *French.* Butt. East. U. States, p. 193.

Vanessa antiopa. F.

1828. Larva, chrys., (brief.) *Stephens.* Ill. Brit. Entom., Haust., vol. 1, p. 45.
1840. Larva, chrys. *P. H. Gosse.* Canad. Naturalist, p. 294.
1841. Larva, chrys. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 219.
1842. Larva, (brief.) *Duncan.* Natural. Library, vol. 6, p. 169.
1852. Larva, chrys. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 238.
1854. Larva, chrys., (col'd figs.) *Emmons.* Nat. Hist. N. York, vol. 5, p. 207, pl. 6.
1855. Larva, chrys., (col'd figs.) *Westwood.* Brit. Butt., p. 50, pl. 7.
1856. Larva, chrys. *Chenu—Lucas.* Encyc. Nat. Hist. Papillons, vol. 1, p. 103.
1857. Larva, chrys., (brief.) *H. T. Stainton.* Brit. Butt., Moths, vol. 1, p. 39.
1859. Larva, chrys. *Edward Newman.* Butt. Young England, p. 9.
1862. Larva, chrys., (fig.) *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 297.
1864. Larva, chrys. *Jaeger.* Life N. Amer. Ins., p. 202.
1864. Larva, chrysalis. *Lintner.* Proc. Entom. Soc. Philad., vol. 3, p. 59.
1869. Larva. *Harris.* Entom. Corres., p. 280.
1869. Larva. *Saunders.* Canad. Entom., vol. 1, p. 75.
1871. Egg. *Scudder.* Rept. Peabody Acad. Sc., p. 40.
1878. Larva, chrysalis, (brief.) *G. H. Perkins.* 5th Rept. Vermont Board Agr., p. 265.
1879. Larva, chrysalis, (fig.) *Mrs. I. P. Ballard.* Insect Lives, p. 40.
1880. Larva. *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 85.
1880. Larva. *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 163.

1881. Egg, (fig.) *Scudder.* Butt., their structure, etc., p. 98.
1881. Larva, chrysalis, (fig.) *Scudder.* Loc. cit., p. 37.
1881. Larva, (brief.) *Packard* Ins. Inj. Forest Trees, p. 64.
1882. Larva, chrysalis. *W. F. Kirby.* Europ. Butt. and Moths, p. 12.
1884. Egg, (fig.) *Fernald.* Butt. Maine, p. 56.
1884. Larva, chrysalis. *Fernald.* Loc. cit, p. 56.
1885. Egg, larva. *Hy. Edwards.* Kingsley's Stand. N. Hist., vol. 2, p. 487.
1886. Egg, (fig.) *French.* Butt. East. U. States, p. 194.
1886. Larva, chrysalis. *French.* Loc. cit., p. 194.
FOOD PLANT. *Salix.*

Vanessa californica. Bois.
1863. Larva, (brief) *Behr.* Proc. Cal. Acad. Sc., vol. 3, p. 123.
1875. Larva, chrysalis. *Hy. Edwards.* Proc. Cal. Acad. Sc., vol. 5, p. 123.
FOOD PLANT. *Ceanothus thyrsiflorus.*

Vanessa milbertii. Godt.
1840. Larva. *W. H. Gosse.* Canad. Naturalist, pp. 107, 221.
1862. Larva, chrysalis. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 303.
1863. Larva. *Saunders.* Proc. Entom. Soc. Philad., vol. 2, p. 28.
1864. Larva, chrysalis. *Lintner.* Proc. Entom. Soc. Philad., vol. 3, p. 61.
1869. Larva. *Saunders.* Canad. Entom., vol. 1, p. 76.
1873. Larva, chrysalis. *Hy. Edwards.* Proc. Cal. Acad. Sc., vol. 5, p. 170.
1880. Larva. *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 85.
1880. Larva. *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 161.
1881. Egg, (fig.) *Scudder.* Butt., their structure, etc., p. 99.
1884. Larva. *Fernald.* Butt. Maine, p. 57.
1885. Life history. *W. H. Edwards.* Canad. Entom., vol. 17, p. 181.
1886. Larva, chrysalis. *French.* Butt. East. U. States, p. 195.
FOOD PLANT. *Urtica.*

Pyrameis atalanta. L.
1828. Larva, chrysalis, (brief.) *Stephens.* Ill. Brit. Entom., Haust., vol. 1, p. 46.
1842. Larva, (brief.) *Duncan.* Natural. Library, Entom., vol. 6, p. 171.
1855. Larva, chrysalis, (col'd fig.) *Westwood.* Brit. Butt., p. 53, pl. 8.
1856. Larva, chrysalis. *Chenu—Lucas.* Encyc. Nat. Hist. Papillons, vol. 1, p. 103.
1857. Larva. *Stainton.* Man. Brit. Butt., vol. 1, p. 38.
1859. Larva, chrysalis. *Edw. Newman.* Butt. Young England, p. 10.
1862. Larva, chrysalis, (fig.) *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 294.
1862. Larva, chrysalis. *Morris.* Synop. Lep. N. Amer., p. 59.
1864. Larva. *Jaeger.* Life N. Amer. Ins., p. 203.
1869. Larva. *Harris.* Entom. Corres., p. 279.
1873. Larva. *Hy. Edwards.* Proc. Cal. Acad. Sc., vol. 5, p. 169.
1878. Larva. *Birch.* Entom. Month. Mag., vol. 13, p. 209.
1880. Larva. *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 86.
1881. Egg, (fig.) *Scudder.* Butt., their structure, etc., p. 8.
1881. Nest, (fig.) *Scudder.* Loc. cit., p. 109.
1882. Larva, chrysalis. *W. F. Kirby.* Europ. Butt. and Moths, p. 11.
1882. Life history. *W. H. Edwards.* Canad. Entom., vol. 14, p. 229.
1883. Life history, (cont'd.) *W. H. Edwards.* Loc. cit., vol. 15, p. 14.
1884. Egg, (fig.) *Fernald.* Butt. Maine, p. 58.
1884. Larva. *Fernald.* Loc. cit., p. 58.
1886. Life history, (condensed.) *French.* Butt. East. U. States, p. 197.
1886. Egg, (fig.) *French.* Loc. cit.
FOOD PLANTS. *Humulus, Bœhmeria, Urtica.*

Pyrameis huntera. F.
1797. Larva. *Abbot—Smith.* Lep. Ins. Georgia.
1833. Larva, chrysalis, (col'd fig.) *Bois.-Lec.* Hist. Lep. N. Amer., p. 180, pl. 48.

1862. Larva, chrysalis. *Morris*, (quotes Bois. and Lec.) Synop. Lep. N. Amer., p. 60.
1862. Larva, chrysalis. *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 293.
1864. Larva, chrysalis. *Lintner.* Proc. Entom. Soc. Philad., vol. 3, p. 63.
1869. Larva. *Saunders.* Canad. Entom., vol. 1, p. 105.
1873. Larva. *Hy. Edwards.* Proc. Cal. Acad. Sc., vol. 5, p. 170.
1873. Chrysalis. *Hy. Edwards*, (quotes Bois.) Loc. cit., vol. 5, p. 170.
1880. Larva. *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 86.
1880. Larva. *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 153.
1884. Larva. *Fernald.* Butt. Maine, p. 58.
1886. Larva, chrysalis. *French.* Butt. East. U. States, p. 198.
FOOD PLANTS. *Gnaphalium, Antennaria.*

Pyrameis cardui. L.

1828. Larva, chrysalis, (brief.) *Stephens.* Illust. Brit. Entom., Haust., vol. 1, p. 47.
1842. Larva, chrysalis, (brief.) *Duncan.* Natural. Library, Entom., vol. 6, p. 176.
1854. Larva, chrysalis, (col'd figs.) *Emmons.* Nat. Hist. N. York., vol. 5, pl. 46.
1855. Larva, chrysalis, (col'd figs.) *Westwood.* Brit. Butt., p. 55, pl. 8.
1856. Larva, chrysalis. *Chenu—Lucas.* Encyc. Nat. Hist. Papillons, vol. 1, p. 104.
1857. Larva. *Stainton.* Man. Brit. Butt., p. 37.
1859. Larva, chrysalis. *Edw. Newman.* Butt. Young England, p. 10.
1862. Larva, chrysalis. *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 292.
1862. Larva, chrysalis. *Morris.* Synop. Lep. N. Amer., p. 60.
1864. Larva. *Jaeger.* Life N. Amer. Insects, p. 204.
1869. Larva. *Saunders.* Canad. Entom., vol. 1, p. 93.
1869. Larva, chrysalis, (figs.) *Harris.* Entom. Corres., p. 277, pl. 1.
1873. Larva. *Hy. Edwards*, (quotes Stainton.) Proc. Cal. Acad. Sc., vol. 5, p. 170.
1876. Larva. *Scudder.* Amer. Naturalist, vol. 10, pp. 392, 602.
1880. Larva. *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 87.
1880. Larva. *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 153.
1881. Larva, (brief.) *Gundlach.* Entom. Cubana, p. 40.
1882. Larva, chrys. *W. F. Kirby.* Europ. Butt. and Moths, p. 13.
1884. Larva. *Fernald.* Butt. Maine, p. 59.
1886. Larva. *French.* Butt. East. U. States, p. 200.
FOOD PLANTS. *Cnicus, Carduus, Althæa, Urtica.*

Pyrameis caryæ. Hübn.

1863. Larva, (brief.) *Behr.* Proc. Cal. Acad. Sc., vol. 3, p. 125.
1874. Larval stages, chrysalis. *Hy. Edwards.* Loc. cit., vol. 5, p. 329.
FOOD PLANT. *Lavatera assurgentiflora.*

Junonia cœnia. Hübn.

1797. Larva, (col'd fig.) *Abbott—Smith.* Lep. Ins. Georgia, pl. 8.
1833. Larva, chrysalis, (col'd fig.) *Bois–Lec.* Hist. Lep. N. Amer., p. 182, pl. 49.
1862. Larva, chrysalis. *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 293.
1873. Larva. *Hy. Edwards.* Proc. Cal. Acad. Sc., vol. 5, p. 171.
1873. Chrysalis, (brief.) *Hy. Edwards.* Loc. cit., vol. 5, p. 171.
1880. Larva, (brief.) *Saunders.* Rept. Entom. Soc. Ontario, p. 40.
1880. Larva. *Miss Middleton.* Trans. Dept. Agr. Ill , vol. 18, Append., p. 87.
1884. Larva. *Fernald.* Butt. Maine, p. 60.
1886. Larva. *French.* Butt. East. U. States, p. 201.
FOOD PLANTS. *Plantago, Gerardia, Antirrhinum.*

Limenitis ursula. Fab.

1833. Larva, chrysalis, (col'd figs.) *Bois.–Lec.* Hist. Lep. N. Amer., p. 199, pl. 53.
1859. Larva, (brief.) *P. H. Gosse.* Letters from Alabama, p. 123.
1862. Larva, chrysalis. *Morris*, (quotes Bois.–Lec.) Synop. Lep. N. Am., p. 65.
1862. Larva, chrysalis. *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 283.

1869. Larva, chrysalis, (fig.) *Harris.* Entom. Corres., p. 276, pl. 4.
1871. Larva. *Riley.* Canad. Entom., vol. 3, p. 52.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 154.
1880. Larva. *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 87.
1880. Larva. *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 162.
1881. Larva stages. *W. H. Edwards.* Canad. Entom., vol. 13, p. 242.
1883. Larva, chrysalis, (brief.) *Saunders.* Ins. Inj. Fruits, p. 218.
1886. Larva, (brief.) *French.* Butt. East. U. States, p. 207.
FOOD PLANTS. *Vaccinium, Cerasus, Ribes, Quercus, Salix, etc.*

Limenitis arthemis. Drury, (incl. vars.)
1840. Larva, chrys. (figs.) *P. H. Gosse.* Canad. Naturalist, pp. 220, 221.
1864. Larva, chrysalis. *Lintner.* Proc. Entom. Soc. Philad., vol. 3, p. 62.
1875. Larva. *T. L. Mead.* Canad. Entom., vol. 7, p. 163, (var. proserpina.)
1875. Life history. *T. L. Mead.* Canad. Entom., vol. 7, p. 162.
1877. Larva. *Scudder.* Psyche, vol. 1, p. 14.
1879. Life history. *W. H. Edwards.* Canad. Entom., vol. 11, p. 224.
1879. Life history. *W. H. Edwards.* Canad. Entom., vol. 11, p. 224, (var. proserpina.)
1879. Life history, (col'd figs.) *W. H. Edwards.* Butt. N. Amer., 2d series, pl. Limenitis, No. 1.
1881. Nest, (fig.) *Scudder.* Butt., their structure, etc., p. 113.
1884. Egg, larva, chrysalis. *Fernald.* Butt. Maine, p. 62.
1886. Life history, (condensed.) *French.* Butt. East. U. States, p. 208.
FOOD PLANTS. *Crataegus, Salix.*

Limenitis disippus. Godt.
1833. Larva, chrysalis, (col'd figs.) *Bois.-Lec.* Hist. Lep. N. Amer., p. 204, pl. 55.
1856. Larva. *Fitch.* 3d Rept. Ins. N. York, p. 379.
1862. Larva, chrysalis. *Morris,* (quotes Bois.-Lec.) Synop. Lep. N. Amer., p. 66.
1862. Larva, chrysalis. *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 282.
1864. Larva, chrysalis. *Lintner.* Proc. Entom. Soc. Philad., vol. 3, p. 63.
1869. Larva. *Saunders.* Canad. Entom., vol. 1, p. 94.
1869. Larva, chrysalis. Amer. Entom., vol. 1, p. 193.
1871. Larva. *Riley.* Canad. Entom., vol. 3, p. 52.
1871. Egg, (figs.) *Riley.* 3d Missouri Rept., p. 153.
1871. Larva, chrysalis, (figs.) *Riley.* Loc. cit., pp. 153–157.
1874. Life history, (figs.) *Saunders.* Canad. Entom., vol. 6, p. 46.
1874. Larva, chrysalis. *Hy. Edwards.* Proc. Cal. Acad. Sc., vol. 5, p. 330.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 154.
1879. Life history. *W. H. Edwards.* Canad. Entom., vol. 11, p. 224.
1881. Nest, (fig.) *Scudder,* (quotes Riley.) Butt., their structure, etc., p. 112.
1881. Egg, (fig.) *Scudder,* (quotes Riley.) Loc. cit., p. 10.
1881. Larva, chrysalis, (figs.) *Scudder,* (quotes Riley.) Butt., their structure, etc., pp. 22, 45.
1883. Egg, larva, chrysalis, (figs.) *Saunders.* Ins. Inj. Fruits, pp. 169, 170.
1884. Egg, larva, chrysalis, (figs.) *Fernald.* Butt. Maine, pp. 63, 64.
1886. Egg, larva, chrysalis, (figs.) *French.* Butt. East. U. States, p. 211.
1886. Life history, (condensed.) *French.* Loc. cit., p. 211.
FOOD PLANTS. *Salix, Populus, etc.*

Limenitis eros. Edw.
1880. Larval stages, chrysalis. *W. H. Edwards.* Canad. Entom., vol. 12, p. 246.
1883. Life history, (col'd figs.) *W. H. Edwards.* Butt. N. Amer., 2d series, pl. Limenitis, No. 2.
1886. Life history, (condensed.) *French.* Butt. East. U. States, p. 214.

Limenitis lorquini. Bois.

1869. Larva, (brief.) *W. H. Edwards*, (quotes Behr. in lit.) Butt. N. Am. ., pl. Limenitis, No. 3.
1873. Chrysalis. *Hy. Edwards.* Proc. Cal. Acad. Sc., vol. 5, p. 171.
1874. Larva. *Hy. Edwards.* Loc. cit., vol. 5, p. 330.
FOOD PLANT. *Quercus.*

Heterochroa californica. Butler.

1873. Chrysalis. *Hy. Edwards.* Proc. Cal. Acad. Sc., vol. 5, p. 171.
1877. Larva, chrysalis. *Hy. Edwards.* Loc. cit.
FOOD PLANT. *Quercus.*

Apatura clyton. Bois.–Lec., (includ. vars.)

1833. Larva, chrysalis, (col'd figs.) *Bois.–Lec.* Hist. Lep. N. Amer., p. 208, pl. 56.
1856. Larva. *Fitch.* 3d Rept. Ins. N. York, p. 380.
1862. Larva, chrysalis. *Morris*, (quotes Bois.–Lec.) Synop. Lep. N. Amer., p. 68.
1874. Egg, larva, (figs.) *Riley.* 6th Missouri Rept., pp. 140–150, (as A. Herse.)
1876. Life history, (col'd figs.) *W. H. Edwards.* Butt. N. Amer., 2d series, pl. Apatura, No. 2.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 155.
1880. Egg, chrysalis, (figs.) *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 89.
1881. Egg, larva, chrys., (figs.) *Scudder*, (after Riley.) Butt., their structure, etc., p. 262.
1881. Larva, chrys. *Gundlach.* Entom. Cubana, p. 63. (as Doxocopa Idyja. Hbn.)
1886. Egg, larva, chrys., (figs.) *French*, (after Riley.) Butt. East. U. States, p. 219.
1886. Life history, (condensed.) *French.* Loc. cit., p. 219.
FOOD PLANT. *Celtis occidentalis.*

Apatura flora. Edw.

1881. Life history. *W. H. Edwards.* Canad. Entom., vol. 13, p. 81.
1886. Life history, (condensed.) *French*, (quotes W. H. Edwards.) Butt. East. U. States, p. 222.

Apatura celtis. Bois.–Lec.

1833. Larva, chrysalis, (col'd figs.) *Bois.–Lec.* Hist. Lep. N. Amer., p. 210, pl. 57.
1862. Larva, chrysalis. *Morris*, (quotes Bois.–Lec.) Synop. Lep. N. Amer., p. 69.
1874. Egg, (fig.) *Riley*, (as A. lycaon.) 6th Missouri Rept., pp. 137–150.
1874. Larva, chrysalis, (figs.) *Riley.* Loc. cit., pp. 137–150.
1875. Life history, (col'd figs.) *W. H. Edwards.* Butt. N. Amer., 2d series, pl. Apatura, No. 1.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 155.
1880. Larva. *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append. p., 88.
1881. Egg, larva, (figs.) *Scudder.* Butt., their structure, etc., p. 263.
1886. Life history, (figs.) *French.* Butt. East. U. States, p. 216.
FOOD PLANT. *Celtis occidentalis.*

Apatura alicia. Edw.

1886. Larva, (brief.) *W. H. Edwards.* Amer. Entom., vol. 1, 2d series, p. 206.
1880. Life history. *W. H. Edwards.* Psyche, vol. 3, pp. 123–127.

Paphia troglodyta. Fab.

1870. Larva, chrysalis, (figs.) *Riley.* 2d Missouri Report, pp. 125–128.
1871. Larva, chrysalis, (col'd figs.) *W. H. Edwards*, (quotes Hayhurst in lit.) Butts. N. Am., 2d series, pl. Paphia, No. 1.
1873. Life history, (figs.) *Riley.* 5th Missouri Rept., pp. 145–149.
1880. Larva, chrysalis, (figs.) *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 89.
1881. Larva, nest, chrysalis, (figs.) *Scudder*, (after Riley.) Butt., their structure, etc., p. 111.
1886. Larva, chrysalis, (figs.) *French.* Butt. East. U. States, p. 227.

1858. Life history. *W. H. Edwards.* Canad. Entom., vol. 20, p. 41.
FOOD PLANT. *Croton capitatum.*

Debis portlandia. Fab.

1825. Larva. *Say.* N. Amer. Entomology, vol. 2.
1833. Larva, chrysalis, (col'd fig.) *Boisduval—Leconte.* Hist. Lep. N. Amer., p. 226, pl. 58.
1862. Larva, chrysalis, (brief.) *Morris,* (quotes Say.) Synop. Lep. N. Amer., p. 79, (as D. andromacha.)
1862. Larva, chrysalis. *Morris,* (quotes Bois.-Lec.) Loc. cit., p. 79.
1880. Larva. *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 92.
1882. Life history. *W. H. Edwards.* Canad. Entom., vol. 14, p. 84.
1884. Egg, larva, chrysalis. *Fernald.* Butt. Maine, p. 71.
1886. Life history, (condensed.) *French.* Butt. East. U. States, p. 230.

Neonympha canthus. Bois.-Lec.

1883. Egg, larval stages. *W. H. Edwards.* Canad. Entom., vol. 15, p. 64.
1884. Egg, larva. *Fernald.* Butt. Maine, p. 68.
1885. Chrysalis. *W. H. Edwards.* Canad. Entom., vol. 17, p. 112.
1886. Life history, (brief.) *French.* Butt. East. U. States, p. 232.

Neonympha gemma. Hübn.

1833. Larva, chrysalis, (col'd figs.) *Boisduval—Leconte.* Hist. Lep. N. Amer., pl. 62.
1879. Life history, (figs.) *W. H. Edwards.* Canad. Entom., vol. 11, p. 31.
1880. Larva, chrysalis. *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 91.
1881. Life history, (condensed.) *French.* Butt. East. U. States, p. 235.

Neonympha areolatus. Abb.-Sm.

1797. Larva. *Abbot—Smith.* Lep. Ins. Georgia, vol. 1, pl. 13.
1833. Larva, chrysalis, (col'd figs.) *Boisduval—Leconte.* Hist. Lep. N. Amer., pl. 63.
1882. Life history. *W. H. Edwards.* Canad. Entom., vol. 14, p. 163.
1886. Life history, (condensed.) *French.* Butt. East. U. States, p. 237.

Neonympha eurytris. Fab.

1833. Larva, chrysalis, (col'd figs.) *Boisduval—Leconte.* Hist. Lep. N. Amer., pl. 61.
1870. Egg, larval stages. *Saunders.* Canad. Entom., vol. 2, p. 139.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 156.
1878. Life history. *W. H. Edwards.* Canad. Entom., vol. 10, p. 125.
1880. Egg, larva, chrysalis. *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 90.
1880. Larva. *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 184.
1884. Larval stages, chrysalis. *Fernald.* Butt. Maine, p. 67.
1886. Life history, (condensed.) *French.* Butt. East. U. States, p. 238.

Neonympha sosybius. Fab.

1833. Larva, chrysalis, (col'd figs.) *Boisduval—Leconte.* Hist. Lep. N. Amer., pl. 63.
1877. Life history. *W. H. Edwards.* Canad. Entom., vol. 9, p. 229.
1880. Egg, larva, chrysalis. *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 91.
1886. Life history, (condensed.) *French.* Butt. East. U. States, p. 241.

Cœnomympha ampelos. Edw.

1887. Life history. *W. H. Edwards.* Canad. Entom., vol. 19, p. 42.

Satyrus alope. Fab., (includ. vars.)

1833. Larva, chrysalis. *Boisduval—Leconte.* Hist. Lep. N. Amer., p. 228, pl. 59.
1854. Larva, chrysalis, (col'd figs.) *Emmons.* N. Hist. N. York, Entom., vol. 5, pl. 33.

1877. Life history. *W. H. Edwards.* Canad. Entom , vol. 9, p. 141, (var. nephele.)
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 17, p. 156.
1880. Life history. *W. H. Edwards.* Canad. Entom., vol. 12, pp. 21, 51, 90, 109.
1880. Larva, chrysalis. *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 92.
1880. Egg, larva. *Miss Middleton.* Loc. cit., p. 92, (var. nephele.)
1880. Larva. *Coquillett.* Loc. cit., p. 180, (var. nephele.)
1881. Young larva, chrysalis, (figs.) *Scudder.* Butt., their structure, etc., pp. 29–43.
1882. Life history, (col'd fig.) *W. H. Edwards.* Butt. N. Amer., 2d series, pl. Satyrus, 2–3, (incl. vars. nephele–olympus.)
1884. Egg, larva, chrysalis, (figs.) *Fernald.* Butt. Maine, p. 74.
1886. Chrysalis, (fig.) *French.* Butt. East. U. States, p. 246.
1886. Life history, (condensed.) *French.* Loc. cit., p. 246.

Satyrus charon. Edw.

1875. Egg. *T. L. Mead.* Rept. Lepid. Wheeler Exped., vol. 5, p. 773.
1886. Life history. *W. H. Edwards.* Canad. Entom., vol. 18, p. 88.

Chionobas iduna. Edw.

1879. Egg. *W. H. Edwards.* Canad. Entom., vol. 11, p. 143.
1879. Egg, (col'd fig.) *W. H. Edwards.* Butt. N. Amer., 2d series, pl. Chionobas, No. 3.

Chionobas chryxus. West.–Hew.

1875. Egg. *T. L. Mead.* Rept. Lepid. Wheeler Exped., vol. 5, p. 777.

Chionobas ivallda. Mead.

1879. Egg, young larva. *W. H. Edwards.* Canad. Entom., vol. 11, p. 142.
1879. Egg, young larva, (col'd figs.) *W. H. Edwards.* Butt. N. Amer., 2d series, pl. Chionobas, No. 3.

Chionobas semidea. Say.

1863. Egg, larva, chrysalis. *Scudder.* Charact. Insect Fauna, White Mountains, pp. 623, 625.
1874. Larva, chrysalis, (figs.) *Scudder.* Geology N. Hampshire, pl. A.

Chionobas jutta. Hübn.

Egg, larva, (fig'd.) *Holmgren.* Entom. Tidsch., vol. 7, p. 151.
1888. Life history. *T. W. Fyles.* Canad. Entom., vol. 20, p. 131.
1889. Larva, notes on. *T. W. Fyles.* Canad. Entom., vol. 21, p. 12.

Chionobas macounii. Edw.

1888. Egg, larva. *J. Fletcher.* A Trip to Nepigon, p. 12.

NOTE.—It is believed that the larvæ of the Satyrinæ feed exclusively on various species of Grasses and Carices.

Libythea bachmanni. Kirtl.

1833. Larva, chrysalis, (col'd figs.) *Boisduval—Leconte.* Hist. Lep. N. Amer., pl. 64, (as L. motya.)
1874. Life history, (col'd figs.) *W. H. Edwards.* Butt. N. Amer., 2d series, pl. Libythea, No. 1.
1881. Life history. *W. H. Edwards.* Canad. Entom., vol. 13, p. 226.
1886. Life history, (brief.) *French.* Butt. East. U. States, p. 251.

FOOD PLANT. *Celtis.*

Eumenia atala.

1875. Larval stages, chrysalis, (figs.) *Scudder.* Mem. Boston Soc. N. History, vol. 2, p. 413, pl. 14.
1888. Life history, (figs.) *E. A. Schwartz.* Insect Life. U. S. Dept. Agr., vol. 1, p. 37.

FOOD PLANT. *Zamia integrifolia.*

Lemonias nais. Edw.

1883. Life history, (col'd figs.) *W. H. Edwards.* Butt. N. Amer., 2d series, pl. 11, pl. Lemonias, No. 1.

Feniseca tarquinius. Fab.

1833. Larva, chrysalis, (figs.) *Boisduval—Leconte.* Hist. Lep. N. Amer., p. 128, pl. 37.
1886. Life history. *W. H. Edwards.* Canad. Entom., vol. 18, pp. 141-148.
1888. Egg, chrysalis, (brief.) *S. H. Scudder.* Psyche, vol. 5, p. 70.

Feeds on Aphides. So far, the only carniverous lepidopterous larva known in our fauna.

Thecla halesus. Cr.

1883. Larva, chrysalis, (col'd figs.) *Boisduval—Leconte.* Hist. Lep. N. Amer., p. 83, pl. 25.
1862. Larva, chrysalis. *Morris,* (quotes Bois.-Lec.) Synop. Lep. N. Amer., p. 92.
1886. Larva, chrysalis, (brief.) *French,* (quotes Morris.) Butt. East. U. States, p. 256.
1888. Chrysalis. *Hy. Edwards.* Entom. Amer., vol. 3, p. 162.

FOOD PLANT. *Quercus.*

Thecla m. album. Bois.-Lec.

1833. Larva, chrysalis, (col'd figs.) *Boisduval—Leconte.* Hist. Lep. N. Amer., p. 88, pl. 27, (as T. psyche.)
1833. Larva, chrysalis, (col'd figs.) *Boisduval—Leconte.* Hist. Lep. N. Amer., p. 86, pl. 26.
1862. Larva, chrysalis. *Morris,* (quotes Bois.-Lec.) Synop. Lep. N. Amer., p. 93.
1880. Larva, chrysalis. *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 92.
1886. Larva, chrysalis, (brief.) *French.* Butt. East. U. States, p. 256.

FOOD PLANTS. *Quercus, Astragalus.*

Thecla favonius. Abb.-Sm.

1797. Larva, chrysalis, (col'd figs.) *Abbot—Smith.* Lep. Ins. Georgia, vol. 1, pl. 14.
1886. Larva, chrysalis, (brief.) *French,* (quotes Abb.-Sm.) Butt. East. U. States, p. 258.

FOOD PLANT. *Quercus.*

Thecla humuli. Harr.

1833. Larva, chrysalis, (col'd figs.) *Boisduval—Leconte.* Hist. Lep. N. Amer., p. 90, pl. 28, (as T. hyperici.)
1833. Larva, chrysalis, (col'd figs.) *Boisdural—Leconte.* Hist. Lep. N. Amer., p. 99, pl. 31, (as T. liparops.)
1852. Larva, (brief.) *Harris.* Ins. Inj. Veget., 2d edit., p. 235.
1862. Larva, chrysalis. *Morris,* (quotes Bois.-Lec.) Synop. Lep. N. Amer., pp. 96, 97, (as T. liparops.)
1862. Larva, chrysalis. *Morris,* (quotes Bois.-Lec.) Synop. Lep. N. Amer., p. 94, (as T. hyperici.)
1862. Larva, chrysalis. *Harris.* Ins. Inj. Veget., Flint's edit., p. 276.
1877. Larva. *Packard,* (quotes Harris.) Inj. Ins. West, Hayden's Rept., p. 773.
1880. Larva. *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 92.

FOOD PLANT. *Humulus.*

Thecla acadica. Edw.

1868. Larva. *Saunders.* Canad. Entom., vol. 1, p. 95.
1869. Larva, (col'd fig.) *W. H. Edwards.* Butt. N. Amer., 1st series, pl. Thecla, No. 1.
1880. Larva. *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 93.
1886. Larva. *French,* (quotes Saunders.) Butt. East. U. States, p. 261.

FOOD PLANT. *Salix.*

Thecla calanus. Hübn.

1833. Larva, chrysalis, (col'd figs.) *Boisduval—Leconte.* Hist. Lep. N. Amer., p. 92, pl. 29, (as T. falacer.)

1862. Larva, chrysalis. *Morris*, (quotes Bois.-Lec.) Synop. Lep. N. Amer., p. 95.
1869. Egg. *Saunders.* Canad. Entom., vol. 1, p. 57.
1869. Larva, (?). *Saunders.* Canad. Entom., vol. 1, p. 98.
1870. Larva. *Saunders.* Canad. Entom., vol. 2, p. 61, (as T. inornata.)
1880. Larva, (?) *Miss Middleton*, (quotes Saunders.) Trans. Dept. Agr. Ill., vol. 18, Append., p. 93.
1881. Larva. *Packard.* Ins. Inj. Forest Trees, p. 83.
1886. Larva, chrysalis. *French*, (quotes Saunders.) Butt. East. U. States, p. 264.

FOOD PLANT. *Quercus.*

Thecla strigosa. Harris.

1868. Larva. *Saunders.* Canad. Entom., vol. 1, p. 99.
1869. Larva, chrysalis. *W. H. Edwards*, (quotes Saunders.) Butt. N. Amer., 1st series, pl. Thecla, No. 2.
1880. Larva. *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 92.
1883. Larva, chrysalis. *Saunders.* Ins. Inj. Fruits, p. 176.
1884. Larva. *Fernald*, (quotes Saunders.) Butt. Maine, p. 78.
1886. Larva, chrysalis. *French*, (quotes Saunders.) Butt. East. U. States, p. 267.

FOOD PLANT. *Quercus, etc.*

Thecla smilacis. Bois.-Lec.

1883. Larva, chrysalis, (col'd figs.) *Boisduval—Leconte.* Hist. Lep. N. Amer., p. 107, pl. 33.
1862. Larva, chrysalis. *Morris*, (quotes Bois.-Lec.) Synop. Lep. N. Amer., p. 99.
1880. Larva, chrysalis. *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 93.
1884. Larva, chrysalis, (brief.) *Saunders.* Canad. Entom , vol. 16, p. 52.
1886. Larva, chrysalis, (brief.) *French.* Butt. East. U. States, p. 268.

FOOD PLANT. *Smilax rotundifolia.*

Thecla poeas. Hübn.

1880. Larva, (brief.) *Riley.* Amer. Entom., vol. 1, 2d series, p. 201.
1880. Larva, (brief.) *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 93.

FOOD PLANT. *Gossypium.*

Thecla irioides. Bois.

1878. Larva, chrysalis. *Hy. Edwards.* Proc. Cal. Acad. Sc., June.

FOOD PLANT. *Sedum spathulifolium.*

Thecla irus. Godt., (incl. vars.)

1833. Larva, chrysalis, (col'd figs.) *Boisduval—Leconte.* Hist. Lep. N. Amer., p. 101, pl. 31.
1833. Larva, chrysalis, (col'd figs.) *Boisduval—Leconte.* Hist. Lep. N. Amer., p. 103, pl. 32, (as T. arsace.)
1862. Larva, chrysalis. *Morris*, (quotes Bois.-Lec.) Synop. Lep. N. Amer., p. 97, (as T. arsace.)
1862. Larva, chrysalis. *Morris*, (quotes Bois.-Lec.) Synop. Lep. N. Amer., p. 97, (as T. iris.)
1880. Larva, chrysalis. *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 94.

FOOD PLANT. *Vaccinium corymbosum.*

Thecla henrici. Grote-Rob.

1881. Life history. *W. H. Edwards.* Papilio, vol. 1, p. 150.
1884. Life history, (condensed.) *Fernald*, (quotes W. H. Edwards.) Butt. Maine, p. 81.
1886. Life history, (condensed.) *French.* Butt. East. U. States, p. 274.

FOOD PLANT. *Prunus.*

Thecla niphon. Hübn.

1833. Larva, chrysalis. *Boisduval—Leconte.* Hist. Lep. N. Amer., p. 105, pl. 33.
1858. Larva, chrysalis. *Fitch.* 4th Rept. N. Y. Agr. Soc., pp. 57, 743.
1862. Larva, chrysalis. *Morris,* (quotes Bois.-Lec.) Synop. Lep. N. Amer., p. 98.
1868. Larva. *Saunders.* Canad. Entom., vol. 1, p. 96.
1880. Larva, chrysalis. *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 94.
1881. Larva. *Packard,* (quotes Fitch.) Ins. Inj. Forest Trees, p. 201.
1884. Larva, chrysalis. *Fernald.* Butt. Maine, p. 83.
1884. Egg. *Fletcher.* Canad. Entom., vol, 16, p. 92.
1886. Larva, chrysalis, (brief.) *French.* Butt. East. U. States, p. 276.

FOOD PLANT. *Pinus.*

Thecla titus. Fab.

1833. Larva, chrysalis. *Boisduval—Leconte.* Hist. Lep. N. Amer., p. 109, pl. 34.
1862. Larva, chrysalis. *Morris,* (quotes Bois.-Lec.) Synop. Lep. N. Amer., p. 102.
1868. Larva. *Saunders.* Canad. Entom., vol. 1, p. 96.
1880. Larva. *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 94.
1883. Larva, chrysalis. *Saunders.* Ins. Inj. Fruits, p. 219.
1884. Larva, chrysalis. *Fernald.* Butt. Maine, p. 84.
1886. Larva, chrysalis, (brief.) *French.* Butt. East. U. States, p. 278.

FOOD PLANT. *Quercus.*

Chrysophanus thoe. Bois.-Lec.

1868. Egg. *Saunders.* Canad. Entom., vol. 1, p. 57.
1880. Egg. *Miss Middleton,* (quotes Saunders.) Trans. Dept. Agr. Ill., vol. 18, Append., p. 95.
1881. Egg, (fig.) *Scudder.* Butt., their structure, etc., p. 8.
1886. Egg. *French,* (quotes Saunders.) Butt. East. U. States, p. 281.

FOOD PLANT. *Polygonum.*

Chrysophanus xanthoides. Bois.

1887. Egg. *Hy. Edwards.* Entom. Amer., vol. 3, p. 162.

Chrysophanus helloides. Bois.

1875. Larva, chrysalis. *T. L. Mead.* Rept. Lep. Wheeler Expd., vol. 5, p. 780.

Chrysophanus epixanthe. Bois.-Lec.

1868. Egg. *Saunders.* Canad. Entom., vol. 1, p. 57.
1886. Egg. *French,* (quotes Saunders.) Butt. East. U. States, p. 282.

Chrysophanus hypophleas. Bois.

1840. Egg. *P. H. Gosse.* Canad. Naturalist, p. 221.
1862. Larva, (brief.) *Packard.* 2d Rept. Nat. Hist. Geol. Maine, p. 166.
1862. Larva, chrysalis. *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 274.
1868. Larva. *Saunders.* Canad. Entom., vol. 1, p. 4.
1880. Larva. *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 95.
1881. Egg, larva, chrysalis, (figs.) *Scudder.* Butt., their structure, etc., pp. 7, 20, 31, 43.
1884. Larva, chrysalis, (figs.) *Fernald.* Butt. Maine, p. 88.
1885. Larva. *Hy. Edwards.* Kingsley's Stand. Nat. Hist., vol. 2, p. 476.
1886 Egg, larva, chrysalis, (figs.) *French,* (quotes Saunders and Scudder.) Butt. East. U. States, p. 283.

FOOD PLANT. *Rumex acetosella.*

Lycæna lycea. Edw.

1875. Larva, (brief.) *T. L. Mead.* Rept. Lep. Wheeler Expd., vol. 5, p. 785.

Lycæna pembina. Edw.

1868. Larva. *Saunders.* Canad. Entom., vol. 1, p. 12.

Lycæna melissa. Edw.

1884. Life history. *W. H. Edwards.* Papilio, vol. 4, p. 91.

FOOD PLANT. *Astragalus.*

Lycæna scudderi. Edw.

1878. Larva. *Saunders.* Canad. Entom., vol. 10, p. 14.

1880. Larva. *Miss Middleton,* (quotes Saunders.) Trans. Dept. Agr. Ill, vol. 18, Append., p. 95.

FOOD PLANT. *Lupinus perennis.*

Lycæna acmon. Doubl.-Hew.

1875. Larva. *Hy. Edwards.* Proc. Cal. Acad. Sc., April, (as L. antægon.)

FOOD PLANT. *Hosackia.*

Lycæna pseudargiolus. Bois.-Lec., (includ. vars.)

1797. Larva, chrys. *Abbot—Smith.* Lep. Ins. Georgia.

1833. Larva, chrysalis. *Boisduval—Leconte.* Hist. Lep. N. Amer., p. 118.

1862. Larva, chrysalis. *Morris,* (quotes Bois.-Lec.) Synop. Lep. N. Amer., p. 82.

1868. Larva. *Saunders.* Canad. Entom., vol. 1, p. 100, (as L. neglecta.)

1869. Larva, (col'd fig.) *W. H. Edwards,* (quotes Abb.-Sm., Bois.-Lec.) Butt. N. Amer., 1st series, pl. Lycæna, No. 2.

1873. Egg, larval stages. *W. H. Edwards.* Canad. Entom., vol. 5, p. 224.

1875. Egg, larva. *W. H. Edwards.* Canad. Entom., vol. 7, p. 81.

1878. Life history. *W. H. Edwards.* Canad. Entom., vol. 10, p. 12.

1880. Larva. *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 95.

1880. Larva. *Miss Middleton.* Loc. cit., p. 96, (as L. neglecta.)

1883. Life history. *W. H. Edwards.* Papilio, vol. 3, pp. 85–97.

1884. Life history, (col'd figs.) *W. H. Edwards.* Butt. N. Amer., 2d series, pl. Lycæna, No. 2.

1884. Larva, chrysalis. *Fernald.* Butt. Maine, p. 89, (as L. neglecta.)

1886. Life history, (condensed.) *French.* Butt. East. U. States, p. 289.

FOOD PLANTS. *Actinomeris, Cornus, etc.*

Lycæna amyntula. Bois.

1884. Life history. *W. G. Wright.* Papilio, vol. 4, p. 126.

FOOD PLANT. *Astragalus.*

Lycæna comyntas. Godt.

1833. Larva, chrysalis, (col'd figs.) *Boisduval—Leconte.* Hist. Lep. N. Amer., p. 120, pl. 36.

1862. Larva, chrysalis. *Morris,* (quotes Bois.-Lec.) Synop. Lep. N. Amer., p. 83.

1862. Larva. *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 275.

1869. Larva, chrysalis. *Harris.* Entom. corres., p. 275.

1876. Life history. *W. H. Edwards.* Canad. Entom., vol. 8, p. 202.

1880. Larva. *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 95.

1884. Egg, larva. *Fernald.* Butt. Maine, p. 92.

1886. Life history. *French,* (quotes W. H. Edwards.) Butt. East. U. States, p. 292.

FOOD PLANTS. *Lespedeza, Phaseolus.*

Carterocephalus mandan. Edw.

1888. Egg, larva. *J. Fletcher.* A Trip to Nepigon, p. 12.

Ancyloxypha numitor. Fab.

1862. Chrysalis, (brief.) *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 308.

1880. Chrysalis. *Miss Middleton,* (quotes Harris.) Trans. Dept. Agr. Ill., vol. 18, Append., p. 96.

1886. Chrysalis. *French,* (quotes Harris.) Butt. East. U. States, p. 301.

Pamphila zabulon. Bois.-Lec., (incl. vars.)

1868. Egg, young larva. *Saunders.* Canad. Entom., vol. 1, p. 66.

1880. Larva. *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 97, (as P. hobomok.)

1881. Egg, larva, (figs.) *Scudder.* Butt., their structure, etc., pp. 7, 23.

1884. Egg, larva, (figs.) *Fernald.* Butt. Maine, p. 95.

1886. Egg, larva, (figs.) *French.* Butt. East. U. States, p. 304.

FOOD PLANT. *Grasses.*

Pamphila phylæus. Drury.

1879. Larva, chrysalis. *A. W. Chapman.* Canad. Entom., vol. 11, p. 190.
1880. Larva. *Miss Middleton,* (quotes Chapman.) Trans. Dept. Agr. Ill., vol. 18, Append., p. 96.
1880. Larva. *Coquillett,* (quotes Chapman.) Loc. cit., p. 176.
1886. Larva, chrysalis. *French,* (quotes Chapman.) Butt. East. U. States, p. 314.

FOOD PLANT. *Grasses.*

Pamphila brettus. Bois.–Lec.

1881. Larva, chrysalis. *Gundlach.* Entom. Cubana, p. 164.
1886. Egg, larva, chrysalis. *French.* Butt. East. U. States, p. 315.

FOOD PLANT. *Grasses.*

Pamphila otho. Bois.–Lec.

1833. Larva, chrysalis, (col'd figs.) *Boisduval—Leconte.* Hist. Lep. N. Amer., pl. 17.

Pamphila mystic. Scud.

1869. Egg, larval stages. *Saunders.* Canad. Entom., vol. 1, p. 65.
1880. Larva. *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 97.
1884. Egg, larva. *Fernald.* Butt. Maine, p. 98.
1886. Egg, larva. *French.* Butt. East. U. States, p. 319.

FOOD PLANT. *Grasses.*

Pamphila sassacus. Harris.

1880. Larva. *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 97.

Pamphila cernes. Bois.–Lec.

1888. Egg, larva. *J. Fletcher.* A Trip to Nepigon, p. 14.

Pamphila peckius. Kby.

1868. Egg, young larva. *Saunders.* Canad. Entom., vol. 1, p. 66.
1880. Larva. *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 178.
1884. Egg, larva. *Fernald.* Butt. Maine, p. 98.
1886. Egg, larva. *Fernald.* Butt. East. U. States, p. 318.

FOOD PLANT. *Grasses.*

Pamphila accius. Abb.–Smith.

1879. Larva. *A. W. Chapman.* Canad. Entom., vol. 11, p. 91.
1881. Chrysalis, (fig.) *Scudder.* Butt., their structure, etc., p. 42.

Pamphila maculata. Edw.

1879. Larva. *A. W. Chapman.* Canad. Entom., vol. 11, p. 191.
1880. Larva. *Coquillett,* (quotes Chapman.) Trans. Dept. Agr. Ill., vol. 18, Append., p. 176.
1886. Larva, chrysalis. *French.* Butt. East. U. States., p. 330.

Pamphila ethlius. Cram.

1877. Larva. *C. R. Dodge.* Field and Forest, vol. 3, p. 73.
1881. Larva, chrysalis. *Gundlach.* Entom. Cubana, p. 160.
1887. Chrysalis. *Hy. Edwards.* Entom. Amer., vol. 3, p. 163.

Pamphila arpa. Bois.–Lec.

1833. Larva, chrysalis, (figs.) *Boisduval—Leconte.* Hist. Lep. N. Amer., pl. 68.
1879. Larva, chrysalis. *A. W. Chapman.* Canad. Entom., vol. 11, p. 191.
1886. Larva, chrysalis. *French,* (quotes Chapman.) Butt. East. U. States, p. 339.

FOOD PLANT. *Saw-palmetto.*

Pamphila palatka. Edw.

1833. Larva, chrysalis, (figs.) *Boisduval—Leconte.* Hist. Lep. N. Amer., pl. 67, (as P. bulenta.)
1879. Larva. *Chapman.* Canad. Entom., vol. 11, p. 192.
1880. Larva. *Coquillett,* (quotes Chapman.) Trans. Dept. Agr. Ill., vol. 18. Append., p. 154.

1886. Larva. *French*, (quotes Chapman.) Butt. East. U. States, p. 341.
FOOD PLANT. *Grasses.*

Pamphila delaware. Edw.

1879. Larva, chrysalis. *A. W. Chapman.* Canad. Entom., vol. 11, p. 193
1880. Larva. *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append., 96.
1880. Larva. *Coquillett*, (quotes Chapman.) Loc. cit., p. 174.
1886. Larva. *French*, (quotes Chapman.) Butt. East. U. States, p. 343.
FOOD PLANT. *Grasses.*

Amblyscirtes vialis. Edw.

1888. Egg, larva. *J. Fletcher.* A Trip to Nepigon, p. 15.

Nisoniades brizo. Bois.-Lec.

1833. Larva, chrysalis, (figs.) *Boisduval—Leconte.* Hist. Lep. N. America, pl. 66.

Nisoniades icelus. Lintn.

1869. Egg. *Lintner.* 3d Rept. N. Y. State Cab. N. Hist., p. 163.
1885. Larva, chrysalis. *W. H. Edwards.* Canad. Entom., vol. 17, p. 98.
1886. Egg. *French*, (quotes Lintner.) Butt. East. U. States, p. 355.
1888. Egg. *J. Fletcher.* A Trip to Nepigon, p. 15.
FOOD PLANT. *Populus tremuloides.*

Nisoniades lucilius. Lintn.

1870. Larva. *Lintner.* 24th Rept. N. Y. State Cab. N. Hist., p. 165.
1875. Egg, young larva. *T. L. Mead.* Canad. Entom., vol. 7, p. 163.
1878. Life history. *Lintner.* Entom. Contrib., No. 4, p. 67.
1880. Larva. *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 97.
1886. Egg, larva, chrysalis. *French.* Butt. East. U. States, p. 359.
FOOD PLANT. *Aquilegia canadensis.*

Nisoniades persius. Scud.

1881. Nest, (fig.) *Scudder.* Butt., their structure, etc., p. 108.

Nisoniades juvenalis. Fab.

1797. Larva, chrysalis, (col'd figs.) *Abbot—Smith.* Lep. Ins. Georgia, pl. 21.
1833. Larva, chrysalis, (col'd figs.) *Boisduval—Leconte.* Hist. Lep. N. Amer., pl. 65.
1862. Larva, chrysalis. *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 309.
1880. Larva, chrysalis. *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 97.
1881. Larva, chrysalis, (figs.) *Scudder.* Butt., their structure, etc., p. 114, (as Than. ennius.)
1886. Larva, chrysalis, (brief.) *French*, (quotes Harris.) Butt. East. U. States, p. 364.
FOOD PLANTS. *Lathyrus, Apios, etc.*

Pholisora catullus. Fab.

1797. Larva, chrysalis, (col'd figs.) *Abbot—Smith.* Lep. Ins. Georgia, pl. 24.
1880. Larva. *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 98.
1881. Egg, (fig.) *Scudder.* Butt., their structure, etc., p. 9.
1885. Life history. *W. H. Edwards.* Canad. Entom., vol. 17, p. 245.
1886. Egg, (fig.) *French.* Butt. East. U. States, p. 367.
FOOD PLANTS. *Monarda, Chenopodium, Ambrosia.*

Eudamus pylades. Scud.

1881. Egg, (fig.) *Scudder.* Butt., their structure, etc., p. 6.
1884. Egg, (fig.) *Fernald.* Butt. Maine, p. 104.
1886. Egg, (fig.) *French.* Butt. East. U. States, p. 369.

Eudamus bathyllus. Abb.-Smith.

1797. Larva, chrysalis, (col'd figs.) *Abbot—Smith.* Lep. Ins. Georgia, pl. 22.
1833. Larva, chrysalis, (col'd figs.) *Boisduval—Leconte.* Hist. Lep. N. Amer., pl. 71.
1880. Larva. *Miss Middleton.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 98.

Eudamus lycidas. Abbot—Smith.

1797. Larva, chrysalis, (col'd figs.) *Abbot—Smith.* Lep. Ins. Georgia, pl. 20.
1833. Larva, chrysalis, (col'd figs.) *Boisduval—Leconte.* Hist. Lep. N. Amer., pl. 71.

Eudamus cellus. Bois.-Lec.

1833. Larva, chrysalis. *Boisduval—Leconte.* Hist. Lep. N. Amer., pl. 73.

Eudamus tityrus. Fab.

1797. Larva, chrysalis, (col'd figs.) *Abbot—Smith.* Lep. Ins. Georgia, pl. 19
1833. Larva, chrysalis, (col'd figs.) *Boisduval—Leconte.* Hist. Lep. N. Amer., pl. 72.
1841. Larva, chrysalis. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 224.
1852. Larva. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 224.
1854. Larva, chrysalis, (col'd figs.) *Emmons.* Nat. Hist. N. York, pl. 832.
1858. Larva. *Fitch.* 5th Rept. Ins. N. York, § 330.
1859. Larva, nest, chrysalis. *P. H. Gosse.* Letters from Alabama, p. 85.
1862. Larva, chrysalis, (figs.) *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 311.
1862. Larva. *Morris,* (quotes Harris.) Synop. Lep. N. Amer., p. 112.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 163.
1880. Egg, larva. *Miss Middleton.* Loc. cit., vol. 18, Append., p. 98.
1880. Larva. *Coquillett.* Loc. cit., vol. 18, Append., p. 153.
1881. Nest, larva, chrysalis, (figs.) *Scudder.* Butt., their structure, etc., p. 107.
1881. Cocoon, chrysalis, (figs.) *Scudder.* Loc. cit., p. 256.
1881. Larva. *Packard,* (quotes Harris.) Ins. Inj., Forest Trees, p. 100.
1885. Larva. *Hy. Edwards.* Kingsley's Stand. Nat. Hist., vol. 2, p. 475.
1886. Chrysalis, (fig.) *French.* Butt. East. U. States, p. 376.
1886. Life history. *French.* Loc. cit., p. 375.

FOOD PLANTS. *Robinia, Acacia, Wistaria.*

Eudamus proteus. L.

1797. Larva, chrysalis, (col'd figs.) *Abbot—Smith.* Lep. Ins. Georgia, pl. 18.
1833. Larva, chrysalis, (col'd figs.) *Boisduval—Leconte.* Hist. Lep. N. Amer., pl. 69.
1856. Larva. *Chenu—Lucas,* (quote Abb.-Sm.) Encyc. Nat. Hist. Papillons, vol. 1, p. 223.
1879. Larva, chrysalis. *A. W. Chapman.* Canad. Entom., vol. 11, p. 193.
1880. Larva, chrysalis. *Coquillett,* (quotes Chapman.) Trans. Dept. Agr. Ill., vol. 18, Append., p. 184.
1881. Larva, chrysalis. *Gundlach.* Entom. Cubana, p. 169.
1886. Larva, chrysalis. *French,* (quotes Chapman.) Butt. East. U. States, p. 378.

FOOD PLANTS. *Phaseolus, Clitoria.*

Megathymus yuccæ. Bois.-Lec.

1833. Larva, chrysalis, (col'd figs) *Boisduval—Leconte.* Hist. Lep. N. Amer., pl. 70, (as Eudamus Yuccæ.)
1876. Larva, chrysalis, (figs.) *Riley.* Trans. Acad. Sc. St. Louis, pp. 323-344.
1876. Life history, (figs.) *Riley.* 8th Missouri Rept., pp. 168-183.
1877. Life history, (figs.) *Riley.* 9th Missouri Rept , p. 129.
1886. Life history, (figs.) *French,* (quotes Riley.) Butt. East. U. States, p. 383.

FOOD PLANT. *Stems of Yucca.*

Megathymus cofaqui. Strecker.

1876. Larva. *Strecker.* Proc. Acad. Nat. Sc. Philad., p. 148.

HETEROCERA.

SPHINGIDÆ.

Hemaris tenuis. Grote.

1877. Larva. *Grote.* Psyche, vol. 2, p. 66.
1880. Larva. *Coquillett,* (quotes Grote.) Trans. Dept. Agr. Ill., vol. 18, Append., p. 160.

1883. Larva. *Ph. Fischer.* Canad. Entom., vol. 15, p. 238.
1884. Egg, larva. *Ph. Fischer.* Canad. Entom., vol. 16, p. 143.
1886. Larva, pupa. *W. J. Holland.* Canad. Entom., vol. 18, p. 101.
FOOD PLANT. *Symphoricarpus racemosus.*

Hemaris marginalis. Grote.
Life history. *H. S. Jewett.* Bull. Brooklyn Entom. Soc., vol. 4, p. 17.
FOOD PLANT. *Lonicera sempervirens.*

Hemaris diffinis. Bois.
1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 85, pl. 43
1839. Larva. *Harris.* Silliman's Jour. Sc. Art., vol. 36, p. 308.
1859. Larva. *Clemens.* Journal Acad. N. Sc. Philad., (July.)
1862. Larva, (brief.) *Morris,* (quotes Clemens.) Synop. Lep. N. Amer., p. 149.
1870. Larva. *T. L. Mead.* Canad. Entom., vol. 2, p. 157.
1870. Larva. *Lintner.* 24th Rept. N. Y. State Cab. N. Hist., p. 110.
1874. Larva. *Boisduval.* Spec. Gener. Sphingidæ, p. 367.
1880. Larva. *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 160.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 99.
1882. Larva. *E. B. Reed.* 12th Rept. Entom. Soc. Ontario, p. 50.
1886. Larva. *Fernald.* Sphingidæ N. Engl'd, p. 15.
FOOD PLANTS. *Apocynum, Symphoricarpus.*

Hemaris thysbe. Fab., (includ. vars.)
1864. Larva, pupa. *Lintner.* Proc. Entom. Soc. Philad., vol. 3, p. 646.
1874. Larva. *Boisduval.* Spec. Gener. Sphingidæ, p. 370.
1879. Larva, pupa. *G. D. Hulst.* Bull. Brooklyn Entom. Soc., vol. 2, p. 38
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 99.
1882. Larva. *E. B. Reed.* 12th Rept. Entom. Soc. Ontario, p. 51.
1883. Larva, pupa. *Edwards—Elliot.* Papilio, vol. 3, p. 125, (as H. uniformis.)
1885. Larva. *Fernald.* Kingsley's Stand. Nat. Hist., vol. 2, p. 465.
1886. Larva. *Fernald.* Sphingidæ N. Engl'd, p. 17.
1888. Larva. *J. B. Smith,* (quotes Lintner-Hulst.) Monog. Sphing., p. 100
FOOD PLANTS. *Viburnum, Cratægus, Prunus, etc.*

Hemaris buffaloensis. G. and R.
1870. Life history. *Lintner.* 24th Rept. N. York State Cab. N. Hist., p. 112.
1888. Larva. *J. B. Smith,* (quotes Lintner.) Monog. Sphing., p. 105.
FOOD PLANT. *Viburnum.*

Hemaris etolus. Bois.
1874. Larva. *Boisduval.* Spec. Gener. Sphingidæ, p. 370.
FOOD PLANT. *Viburnum.*

Hemaris pyramus. Bois.
1874. Larva. *Boisduval,* (quotes Leconte.) Spec. Gener. Sphingidæ, p. 372.
FOOD PLANT. *Viburnum.*

Ællopos tantalus. L.
1887. Pupa. *Hy. Edwards.* Entom. Amer., vol. 3, p. 163.

Cautethia grotei. Hy. Edwards.
1881. Larva. *Gundlach.* Entom. Cubana.
1887. Pupa. *Hy. Edwards.* Entom. Amer., vol. 3, p. 164.
FOOD PLANT. *Rubiaceæ.*

Pogocolon gauræ. Abb.-Sm.
1797. Larva, pupa, (fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 61, pl. 31.
1859. Larva. *Clemens.* Jour. Acad. N. Sc., Philad.
1862. Larva, pupa. *Morris,* (quotes Abb.-Sm.) Synop. Lep. N. Amer., p. 154.
1874. Larva. *Boisduval,* (quotes Abb.-Sm.) Spec. Gener. Sphingidæ, p. 315.
FOOD PLANT. *Gaura biennis.*

Amphion nessus. Cramer.
1874. Larva, (col'd fig.) *Boisduval.* Spec. Gener. Sphingidæ, p. 817, pl. 1.
1877. Larva. *W. V. Andrews.* Canad. Entom., vol. 9, p. 19.

1882. Larva. *E. B. Reed*, (quotes Andrews.) 12th Rept. Entom. Soc. Ontario.
1882. Larva, brief. *Julia E. Saunders.* Papilio, vol. 2, p. 147.
1886. Larva. *Fernald.* Sphingidæ N. Engl'd, p. 21.
FOOD PLANTS. *Rubiaceæ, Vitis.*

Thyreus abbotii. Swainson.
1839. Larva. *Harris.* Silliman's Jour. Sc. Art, vol. 36, p. 307.
1856. Larva, (fig.) *Chenu—Demarets.* Encyc. Hist. Nat. Papillons, vol. 1, p. 257.
1859. Larva, pupa. *Clemens.* Jour. Acad. N. Sc. Philad., July.
1862. Larva, pupa. *Morris*, (quotes Clemens.) Synop. Lep. N. Amer., p. 156.
1869. Larva. *Harris.* Entom. Corres., p. 284.
1870. Larva, pupa. *Lintner.* 24th Rept. N. York State Cab. N. Hist., p. 114.
1874. Larva, pupa. *Boisduval.* Spec. Gener. Sphingidæ, p. 331, (from Abbot's drawing.)
1876. Larva. *C. P. Whitney.* Canad. Entom., vol. 8, p. 75.
1876. Larva, (brief.) *A. R. Grote.* Canad. Entom., vol. 8, p. 100.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 164.
1878. Larva, (fig.) *G. H. Perkins.* 5th Rept. Vermont Agr. Soc., p. 281.
1878. Larva, (fig.) *Saunders.* Canad. Entom., vol. 10, p. 130.
1879. Life history, (figs.) *Riley.* 2d Missouri Rept., p. 78.
1880. Larva, (fig.) *Saunders.* Rept. Entom. Soc. Ontario, p. 42.
1880. Larva, (fig.) *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 100.
1881. Larva, (fig.) *Saunders.* Canad. Entom., vol. 13, p. 2.
1882. Larva, (fig.) *E. B. Reed.* 12th Rept. Entom. Soc. Ontario, p. 53.
1882. Larva, (brief.) *Julia E. Saunders.* Papilio, vol. 2, p. 147.
1883. Larva, pupa, (figs.) *Saunders.* Ins. Inj. Fruits, p. 253.
1886. Larva, (fig.) *Fernald.* Sphingidæ N. Engl'd, p. 23.
FOOD PLANTS. *Vitis, Ampelopsis.*

Enyo lugubris. L.
1797. Larva, pupa, (fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 59, pl. 30.
1837. Larva, pupa. *Westwood*, (quotes Abb.–Sm.) Drury's Illus. Exot. Entom., vol. 1, p. 56.
1839. Larva. *Harris*, (quotes Abb.–Sm.) Silliman's Jour. Sc. Art, vol. 36, p. 307.
1859. Larva. *Clemens.* Jour. Acad. N. Sc. Philad., July.
1862. Larva. *Morris*, (quotes Abb.–Sm.) Synop. Lep. N. Amer., p. 162.
1874. Larva. *Boisduval.* Spec. Gener. Sphingidæ, p. 297.
FOOD PLANT. *Ampelopsis hederacea.*

Deidamia inscripta. Harris.
1862. Pupa. *Clemens.* Morris's Synop. Lep. N. Amer., p. 159.
1877. Larva, pupa. *Strecker*, (fide Akhurst.) Rhopal. et Heteroc., p. 112.
1886. Larva, pupa. *Fernald.* Sphingidæ N. Engl'd, p. 70.
FOOD PLANT. *Ampelopsis.*

Deilephila chamænerii. Harris.
1839. Larva. *Harris.* Silliman's Jour. Sc. Art, vol. 36, p. 305.
1859. Larva. *Clemens.* Jour. Acad. N. Sc. Philad., July.
1862. Larva. *Morris*, (quotes Clemens.) Synop. Lep. N. Amer., p. 165.
1864. Larva, pupa. *Lintner.* Proc. Entom. Soc. Philad., vol. 3, p. 661.
1870. Larva, pupa, (brief.) *G. J. Bowles.* Canad. Entom., vol. 3, p. 145.
1874. Larva. *Boisduval*, (as D. galii.) Spec. Gener. Sphingidæ, p. 170.
1876. Larva, (fig.) *Saunders.* Rept. Entom. Soc. Ontario, p. 37.
1877. Larva, (fig.) *Saunders.* Canad. Entom., vol. 9, p. 64.
1880. Larva. *Coquillett*, (quotes Saunders.) Trans. Dept. Agr. Ill., vol. 18, Append., p. 159.
1882. Larva. *E. B. Reed*, (quotes Saunders.) 12th Rept. Entom. Soc. Ontario, p. 54.
1883. Larva, cocoon, pupa. *Saunders.* Ins. Inj. Fruits, p. 257.

1886. Larva. *Fernald.* Sphingidæ N. Engl'd, p. 55.
1888. Larva, (brief.) *J. B. Smith,* (quotes Harris, Clemens, Morris.) Monog. Sphing., p. 133.

FOOD PLANT. *Epilobium angustifolium.*

Deilephila lineata. Fabr.

1797. Larva, pupa, (fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 77, pl. 39.
1828. Larva, pupa. *Stephens.* Illus. Brit. Entom., Haust., vol. 1, p. 127.
1839. Larva. *Harris.* Silliman's Jour. Sc. Art, vol. 36, p. 304.
1856. Larva, pupa. *Chenu.* Encyc. Hist. Nat. Papillons, p. 262.
1859. Larva, pupa. *Clemens.* Jour. Acad. N. Sc. Philad., July.
1860. Larva. *Duncan.* Natural. Library, vol. 30, p. 152.
1862. Larva, pupa. *Morris,* (quotes Clemens.) Synop. Lep. N. Amer., p. 164.
1864. Larva, pupa. *Lintner.* Proc. Entom Soc. Philad., vol. 3, p. 662.
1871. Larva, (fig.) *Riley.* 3d Missouri Rept., p. 141.
1874. Larva, (fig.) *Saunders.* Rept. Entom. Soc. Ontario, p. 28.
1874. Larva. *Boisduval,* (quotes Abbot as D. daucus.) Spec. Gener. Sphingidæ, p. 174.
1874. Larva, (fig.) *J. G. Wood,* (as D. daucus.) Ins. Abroad, p. 637.
1875. Larva, pupa. *Hy. Edwards.* Proc. Cal. Acad. Sc.
1876. Larva, (fig.) *Saunders.* Rept. Entom. Soc. Ontario, p. 37.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 164.
1877. Larva, (fig.) *Saunders.* Canad. Entom., vol. 9, p. 61.
1880. Larva, (fig.) *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 100.
1880. Larva, (fig.) *Coquillett.* Trans. Dept. Agr. Ill., Append., vol. 18, p. 159.
1882. Larva, (fig.) *E. B. Reed,* (quotes Riley.) 12th Rept. Entom. Soc. Ontario, p. 55.
1883. Larva, pupa, (figs.) *Saunders.* Ins. Inj. Fruits, p. 255.
1886. Larva, (fig.) *Fernald.* Sphingidæ N. Engl'd, p. 57.
1886. Larva, pupa. *Gundlach.* Entom. Cubana, p. 196.

FOOD PLANTS. *Portulaca, Pyrus, Fuchsia, etc.,*

Philampelus vitis. Drury.

1705. Larva, pupa, (col'd figs.) *Merian.* Metam. Ins. Surinam, p. 47, pl. 47.
1797. Larva, pupa, (col'd figs.) *Abbot—Smith.* Lep. Ins. Georgia, p. 79, pl. 40.
1837. Larva, pupa. *Westwood,* (quotes Abb.–Sm.) Drury's Illus. Exot. Entom., vol. 1, p. 55.
1839. Larva. *Harris,* (quotes Abb.–Sm.) Silliman's Jour. Sc. Art, vol. 36, p. 299.
1858. Larva, pupa, (col'd figs.) *Duncan.* Natural. Library, vol. 22, p. 105, pl. 7.
1859. Larva, pupa. *Clemens,* (quotes Abb.–Sm.) Jour. Acad. N. Sc. Philad., July.
1859. Larva, brief, (fig.) *P. H. Gosse.* Letters from Alabama, p. 246.
1862. Larva, pupa. *Morris,* (quotes Clemens.) Synop. Lep. N. Amer., p. 179.
1886. Larva, pupa. *Gundlach.* Entom. Cubana, p. 189.
1886. Larva. *Fernald,* (quotes Clemens.) Sphingidæ N. Engl'd, p. 59.
1887. Larva. *Hy. Edwards.* Entom. Amer., vol. 3, p. 165.

FOOD PLANT. *Jussiæa decurrens.*

Philampelus pandorus. Hübn.

1705. Larva, pupa, (col'd figs.) *Merian.* Metam. Ins. Surinam, p. 47, pl. 47.
1839. Larva. *Harris.* Silliman's Jour. Sc. Art, vol. 36, p. 300, (as P. satellitia.)
1841. Larva, pupa. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 228.
1854. Larva. *Emmons.* Nat. Hist. N. York, vol. 5, p. 220.
1856. Larva. *Fitch.* 3d Rept. Ins. N. York, p. 398.
1859. Larva. *Clemens.* Jour. Acad. Sc. Philad., July.
1862. Larva. *Morris,* (quotes Clemens.) Synop. Lep. N. Amer., p. 177.
1864. Larva, pupa. *Lintner.* Proc. Entom. Soc. Philad., vol. 3, p. 659.
1864. Larva. *Jaeger.* Life N. Amer. Ins., p. 193.

1868. Larva. *Saunders.* Canad. Entom., vol. 1, p. 26.
1874. Larva. *Boisduval.* Spec. Gener. Sphingidæ, p. 200.
1876. Life history, (figs.) *Riley.* 2d Missouri Rept.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 165.
1877. Larva. *Scudder.* Psyche, vol. 2, p. 68.
1880. Larva, (fig.) *Coquillett,* (quotes Clemens.) Trans. Dept. Agr. Ill., vol. 18, Append., p. 175.
1880. Larval stages, (figs.) *J. Marten.* Trans. Dept. Agr. Ill., Append., vol. 18, p. 101.
1881. Larva. *Saunders.* Canad. Entom., vol. 13, p. 41.
1881. Larva. *W. W. Goldsmith,* (quotes Riley.) Kentucky Bureau Agr., p. 254.
1882. Larva, (fig.) *Saunders.* 12th Rept. Entom. Soc. Ontario, p. 19.
1882. Larva, pupa, (figs.) *E. B. Reed* Loc. cit., p. 60.
1883. Larva, pupa, (figs.) *Saunders.* Ins. Inj. Fruits, p. 249.
1886. Larva, (fig.) *Fernald.* Sphingidæ N. Engl'd, p. 60.
1886. Larva, (brief.) *Julia E. Saunders.* Papilio, vol. 2, p. 147.
1888. Larva, pupa, (fig.) *Grote.* 18th Rept. Entom. Soc. Ontario, p. 73.

FOOD PLANTS. *Ampelopsis, Vitis.*

Philampelus achemon. Drury.

1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 81, pl. 41.
1839. Larva. *Harris.* Silliman's Jour. Sc. Art, vol. 36, p. 300.
1841. Larva, pupa. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 228.
1859. Larval stages. *Clemens.* Jour. Acad. N. Sc. Philad., July.
1862. Larval stages. *Morris,* (quotes Clemens). Synop. Lep. N. Amer., p. 178.
1862. Larva, pupa, (figs.) *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 325.
1864. Larva, pupa. *Lintner.* Proc. Entom. Soc. Philad., vol. 3, p. 660.
1869. Larva, (fig.) *Harris.* Entom. Corres., pl. 111.
1870. Egg, larval stages. *Lintner.* 24th Rept. N. York State Cab. N. Hist., p. 116.
1874. Larva. *Boisduval,* (quotes Lorquin in lit.) Spec. Gener. Sphingidæ, p. 200.
1874. Life history. *Riley.* 2d Missouri Rept., p. 74–76.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 165.
1878. Larva, pupa, (fig.) *Saunders.* Canad. Entom., vol. 10, p. 103.
1878. Larva, (fig.) *G. H. Perkins.* 5th Rept. Vermont Board Agr., p. 279.
1879. Larva, pupa, (figs.) *Saunders.* Rept. Entom. Soc. Ontario, p. 74.
1880. Larva, (fig.) *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 101.
1880. Larva, (fig.) *Coquillett,* (quotes Clemens.) Trans. Dept. Agr. Ill., vol. 18, Append., p. 182.
1882. Larva, (brief.) *Julia E. Saunders.* Papilio, vol. 2, p. 147.
1883. Larval stages, pupa, (figs.) *Saunders.* Ins. Inj. Fruits, p. 251.
1886. Larva, pupa, (figs.) *Fernald.* Sphingidæ N. Engl'd, p. 61.

FOOD PLANT. *Vitis.*

Argeus labruscæ. L.

1705. Larva, pupa, (col'd figs.) *Merian.* Metam. Ins. Surinam, p. 34, pl. 34.
1719. Larva, (col'd fig.) *Madame Merian.* Ins. of Surinam, pl. 34.
1874. Larva. *Boisduval,* (quotes Mad. Merian.) Spec. Gener. Sphingidæ, p. 193.
1886. Larva, (brief.) *Gundlach.* Entom. Cubana, p. 187.

FOOD PLANT. *Cissus.*

Pseudosphinx tetrio. L.

1832. Larva, (fig.) *Poey.* Lep. Cubana.
1874. Larva. *Boisduval,* (quotes Poey.) Spec. Gener. Sphingidæ, p. 61.
1878. Larva, pupa, (figs.) *H. Dewitz.* Wiegemann Archiv. Naturgesch., p. 9, pl. 1.
1886. Larva, pupa. *Gundlach.* Entom. Cubana, p. 204.
1887. Pupa. *Hy. Edwards.* Entom. Amer., vol. 3, p. 165.
1887. Pupa. *Hy. Edwards.* Canad. Entom., vol. 20, p. 14.

FOOD PLANTS. *Plumiera rubra. Jasminum.*

Pachylia ficus. L.

1719. Larva, (fig.) *Madame Merian.* Ins. of Surinam, pl. 33.
1874. Larva. *Boisduval,* (quotes Mad. Merian.) Spec. Gener. Sphingidæ, p. 137.
1884. Larva, (brief.) *W. Schaus, jr.* Papilio, vol. 4, p. 21.
1886. Larva, pupa. *Gundlach.* Entom. Cubana, p. 201.
1888. Larva, (brief.) *J. B. Smith,* (quotes Fab., Merian, Boisd.) Monogr. Sphing., p. 139.

FOOD PLANT. *Ficus.*

Chœrocampa tersa. L.

1797. Larva, pupa, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 75, pl. 38.
1837. Larva, pupa. *Westwood,* (quotes Abb.–Sm.) Drury's Ill. Exot. Entom., vol. 1, p. 56.
1839. Larva, pupa. *Harris,* (quotes Abb.–Sm.) Silliman's Jour. Sc. Art, vol. 36, p. 303.
1858. Larva, (col'd fig.) *Duncan.* Natural. Library, vol. 22, p. 100, pl. 6.
1859. Larva. *Clemens.* Jour. Acad. N. Sc. Philad., July.
1862. Larva. *Morris,* (quotes Clemens.) Synop. Lep. N. Amer., p. 172.
1874. Larva, pupa. *Boisduval,* (quotes Abbot.) Spec. Gener. Sphingidæ, p. 260.
1880. Larva. *Coquillett,* (quotes Abb.–Sm.) Trans. Dept. Agr. Ill., vol. 18, Append., p. 159.
1882. Larva. *E. B. Reed.* 12th Rept. Entom. Soc. Ontario, p. 56.
1886. Larva. *Fernald.* Sphingidæ N. Engl'd, p. 63.
1886. Larva, pupa. *Gundlach.* Entom. Cubana, p. 192.
1887. Pupa. *Hy. Edwards.* Entom. Amer., vol. 3, p. 164.

FOOD PLANT. *Rubiaceæ.*

Everyx chœrilus. Bdv.

1797. Larva, pupa. *Abbott—Smith.* Lep. Ins. Georgia, p. 53, pl. 27.
1839. Larva. *Harris,* (quotes Abb.–Sm.) Silliman's Jour. Sc. Art, vol. 36, p. 302.
1859. Larva, pupa. *Clemens,* (quotes Abb.–Sm.) Jour. Acad. N. Sc. Philad.
1862. Larva, pupa. *Morris,* (quotes Clemens.) Synop. Lep. N. Amer., p. 168.
1869. Pupa. *Harris.* Entom. Corres., p. 283.
1874. Larva, pupa. *Boisduval.* Spec. Gener. Sphingidæ, p. 211.
1882. Larva. *E. B. Reed,* (quotes Abb.–Sm.) 12th Rept. Entom. Soc. Ontario, p. 57.
1883. Larva, pupa. *Edwards—Elliot.* Papilio, vol. 3, p. 126.
1886. Larva, pupa. *Fernald,* (quotes Edw.–Elliot.) Sphingidæ N. Eng'd, p. 65.

FOOD PLANTS. *Azalea, Viburnum.*

Everyx myron. Cramer.

1797. Larva, (fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 55, pl. 28.
1839. Larva. *Harris.* Silliman's Jour. Sc. Art, vol. 36, p. 302.
1841. Larva, pupa. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 229.
1852. Larva. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 249.
1856. Larva. *Fitch.* 3d Rept. Ins. N. York, p. 397.
1859. Larva, pupa. *Clemens.* Jour. Acad. N. Sc. Philad., July.
1862. Larva, pupa. *Morris,* (quotes Clemens.) Synop. Lep. N. Amer., p. 169.
1862. Larva, pupa, (fig.) *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 327.
1864. Larval stages, pupa. *Lintner.* Proc. Entom. Soc. Philad., vol. 3, p. 663.
1871. Larva, (fig.) *Saunders.* Rept. Entom. Soc. Ontario, p. 357.
1871. Larva, pupa, (fig.) *Saunders.* Canad. Entom., vol. 3, p. 66.
1871. Life history. (figs.) *Riley.* 2d Missouri Rept., p. 71-73.
1874. Larva, pupa. *Boisduval.* Spec. Gener. Sphingidæ, p. 210.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 166.
1878. Larva, (fig.) *G. H. Perkins.* 5th Rept. Vermont Board Agr., p. 277.
1879. Larva, (fig.) *Mrs. Ballard.* Insect Lives, p. 67.
1880. Larva. (fig.) *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 103.
1882. Larva, pupa, (figs.) *E. B. Reed.* 12th Rept. Entom. Soc. Ontario, p. 58.

1883. Egg, larval stages, pupa, (figs.) *Saunders.* Ins. Inj. Fruits, p. 245.
1885. Egg, larva. *Fernald.* Kingsley's Stand. N. Hist., vol. 2, p. 465.
1886. Egg, larva, pupa, (figs.) *Fernald.* Sphingidæ N. Engl'd, p. 66.
FOOD PLANTS. *Vitis, Ampelopsis, Viburnum.*

Ampelophaga versicolor. Harris.
1876. Larva, (brief.) *G. W. Peck.* Canad. Entom., vol. 8, p. 239.
1878. Life history. *G. D. Hulst.* Canad. Entom., vol. 10, p. 64.
1880. Larva. *Coquillett,* (quotes Hulst.) Trans. Dept. Agr. Ill., vol. 18, Append., p. 158.
1881. Larva, (brief.) *Ph. Fischer.* Bull. Buffalo Soc. N. Sc., vol. 4, p. 62.
1885. Larva. *Ph. Fischer.* Canad. Entom., vol. 17, p. 78.
1886. Egg, larval stages, pupa. *Fernald,* (quotes Hulst.) Sphingidæ N. Engl'd, p. 68.
FOOD PLANT. *Cephalanthus occidentalis.*

Smerinthus ophthalmicus. Bois.
1869. Larva. *Boisduval.* Lep. Califor., p. 68.
1874. Larva, (col'd fig.) pupa. *Boisduval,* (quotes Lorquin in lit.) Spec. Gener. Sphingidæ, p. 34, pl. 1.
1875. Egg, larval stages. *Hy. Edwards.* Proc. Cal. Acad. Sc., April.
FOOD PLANT. *Salix.*

Smerinthus geminatus. Say.
1840. Larva, pupa. *P. H. Gosse.* Canad. Naturalist, pp. 280, 295.
1870. Egg, larval stages. *Lintner.* 24th Rept. N. York State Cab. N. Hist , p. 119.
1874. Larva. *Boisduval.* Spec. Gener. Sphingidæ, p. 39.
1882. Larva. *E. B. Reed.* 12th Rept. Entom. Soc. Ontario, p. 62.
1886. Egg, larva. *Fernald.* Sphingidæ N. Engl'd, p. 78.
FOOD PLANTS. *Prunus, Salix, Betula, etc.*

Smerinthus excæcatus. Abb.–Sm.
1797. Larva, pupa, (figs.) *Abbot—Smith.* Lep. Ins. Georgia, p. 49, pl. 25.
1839. Larva. *Harris.* Silliman's Jour. Sc. Art, vol. 36, p. 290.
1841. Larva, pupa. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 230.
1856. Larva. *Fitch.* 3d Rept. Ins. N. York, p. 341.
1859. Egg, larval stages, pupa. *Clemens.* Jour. Acad. N. Sc. Philad., July.
1862. Egg, larva, pupa. *Morris,* (quotes Clemens.) Synop. Lep. N. Amer., p. 209.
1864. Larva, pupa. *Lintner.* Proc. Entom. Soc. Philad., vol. 3, p. 665.
1868. Larva. *E. B. Reed.* Canad. Entom., vol. 1, p. 40.
1874. Larva, pupa. *Boisduval,* (quotes J. Leconte in lit.) Spec. Gener. Sphingidæ, p. 38, (after Abbot's drawing.)
1876. Larva. *Strecker.* Rhopal. et Heteroc., p. 55.
1877. Larva. *Packard.* Half-hours with Insects, p. 180.
1882. Larva. *E. B. Reed.* 12th Rept. Entom. Soc. Ontario, p. 62.
1883. Larva, (figs.) *Saunders.* Ins. Inj. Fruits, p. 85.
1884. Larva, (fig.) *Saunders.* Canad. Entom., vol. 16, p. 11.
1885. Larva, (fig.) *Saunders.* 15th Rept. Entom. Soc. Ontario, p. 26.
1885. Larva. *Fernald.* Kingsley's Stand. N. Hist., vol. 2, p. 468.
1880. Larva, pupa, (figs.) *Fernald.* Sphingidæ N. Engl'd, p. 74.
FOOD PLANTS. *Pyrus, Prunus, Rosa.*

Smerinthus myops. Abb.–Sm.
1797. Larva, pupa, (figs.) *Abbot—Smith.* Lep. Ins. Georgia, p. 51, pl. 26.
1839. Larva. *Harris,* (quotes Abb.–Sm.) Silliman's Jour. Sc. Art, vol. 36, p. 291.
1859. Larva, pupa. *Clemens.* Jour. Acad. N. Sc. Philad., (after Abbot's figure.)
1862. Larva, pupa. *Morris,* (quotes Clemens.) Synop. Lep. N. Amer., p. 208.
1874. Larva, pupa. *Boisduval,* (quotes J. Leconte in lit.) Spec. Gener. Sphingidæ, p. 42, (after Abbot's figure.)
1876. Larva, (brief.) *G. W. Peck.* Canad. Entom., vol. 8, p. 239.

1882. Larva. *E. B. Reed.* 12th Rept. Entom. Soc. Ontario, p. 61
1883. Larva, pupa. *Saunders.* Ins. Inj. Fruits, p. 208.
1884. Larva. *Saunders.* Canad. Entom., vol. 16, p. 11.
1885. Larva. *Saunders.* 15th Rept. Entom. Soc. Ontario, p. 27.
1886. Larva. *Fernald.* Sphingidæ, N. Engl'd, p. 76.
1886. Larva. *R. Bunker.* Canad. Entom., vol. 18, p. 207.
FOOD PLANT. *Prunus.*

Smerinthus astylus. Drury.

1874. Larva. *Boisduval,* (quotes J. Leconte in lit.) Spec. Gener. Sphingidæ, p. 41.
1876. Larva, (brief.) *G. W. Peck.* Canad. Entom., vol. 8, p. 239.
1886. Larva. *Fernald.* Sphingidæ, N. Engl'd, p. 77.
1888. Larva, (brief.) *J. B. Smith,* (quotes Peck.) Monog. Sphing., p. 229.
FOOD PLANT. *Vaccinium corymbosum.*

Triptogon modesta. Harris.

1877. Life history. *R. Bunker.* Canad. Entom., vol. 9, p. 210.
1877. Larva. *W. V. Andrews.* Psyche, vol. 2, p. 72.
1880. Larva. *Coquillett,* (quotes Andrews.) Trans. Dept. Agr. Ill., vol. 18, Append., p. 159.
1881. Larva, pupa. *D. S. Kellicott.* Bull. Buffalo Soc. N. Sc., vol. 4, p. 29.
1882. Larva. *E. B. Reed.* 12th Rept. Entom. Soc. Ontario, p. 63.
1886. Life history. *Fernald,* (quotes Bunker.) Sphingidæ, N. Engl'd, p. 72.
FOOD PLANTS. *Populus, Salix.*

Cressonia juglandis. Abb.–Sm.

1797. Larva, pupa, (figs.) *Abbot—Smith.* Lep. Ins. Georgia, p. 57, pl. 29.
1839. Larva, pupa. *Harris,* (quotes Abb.–Sm.) Silliman's Jour. Sc. Art, vol. 36, p. 292.
1856. Larva. *Fitch.* 3d Rept. Ins. N. York, p. 462.
1859. Larva, pupa. *Clemens,* (quotes Abb.–Sm.) Jour. Acad. N. Sc. Philad., July.
1862. Larva, pupa. *Morris,* (quotes Clemens.) Synop. Lep. N. Amer., p. 213.
1864. Larva, pupa. *Lintner.* Proc. Entom. Soc. Philad., vol. 3, p. 668.
1869. Larva. *Harris.* Entom. Corres., p. 281.
1874. Larva, pupa. *Boisdural,* (quotes Abbot.) Spec. Gener. Sphingidæ, p. 27.
1876. Larva, pupa. *Strecker,* (quotes Abbot.) Rhopal. et Heteroc., p. 54.
1881. Larva. *Packard,* (quotes Harris.) Ins. Inj. Forest Trees, p. 84.
1882. Larva. *E. B. Reed.* 12th Rept. Entom. Soc. Ontario, p. 63.
1883. Young larva. *Edwards—Elliot.* Papilio, vol. 3, p. 127.
1886. Larva, pupa. *Fernald.* Sphingidæ N. Engl'd, p. 81.
FOOD PLANTS. *Juglans, Carya.*

Ceratomia amyntor. Hübn.

1839. Larva. *Harris.* Silliman's Jour. Sc. Art, vol. 36, p. 293, (as C. quadricornis.)
1841. Larva, pupa. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 227.
1852. Larva, pupa. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 247.
1859. Larva, pupa. *Clemens.* Jour. Acad. N. Sc. Philad., July.
1862. Larva, pupa. *Morris,* (quotes Clemens.) Synop. Lep. N. Amer., p. 205.
1862. Larva, (fig.) *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 324.
1862. Larva, (brief.) *Packard.* 2d Rept. Nat. Hist. and Geolog. Maine, p. 167.
1862. Egg, larval stages, pupa. *Lintner.* Proc. Entom. Soc. Philad., vol. 1, p. 286.
1864. Pupa. *Lintner.* Loc. cit., vol. 3, p. 664.
1864. Larva. *Jaeger.* Life N. Amer. Ins., p. 192.
1869. Egg. *Minot.* Canad. Entom., vol. 2, p. 28.
1869. Larva, pupa. *Harris.* Entom. Corres., p. 282.
1874. Larva, pupa, (col'd fig.) *Boisdural.* Spec. Gener. Sphingidæ, p. 54, pl. 1.
1876. Larva, (brief.) *R. Bunker.* Canad. Entom., vol. 8, p. 120.

1876. Larva, (brief.) *W. V. Andrews.* Canad. Entom., vol. 8, p. 40.
1877. Larva. *French,* (quotes Harris.) Trans. Dept. Agr. Ill., vol 15, p. 167.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 102.
1881. Larva, (brief.) *Packard.* Ins. Inj. Forest Trees, p. 67.
1882. Larva. *E. B. Reed.* 12th Rept. Entom. Soc. Ontario, p. 64.
1886. Egg, larva. *Fernald.* Sphingidæ N. Engl'd, p. 25.
FOOD PLANT. *Ulmus americanus.*

Daremma undulosa. Walk.
1859. Larva, (brief.) *Clemens,* (as C. repentinus.) Jour. Acad. N. Sc. Philad., July.
1862. Larva, (brief.) *Morris,* (quotes Clemens.) Synop. Lep. N. Amer , p. 206.
1870. Egg, larval stages, pupa. *Lintner.* 24th Rept. N. York State Cab. N. Hist., pp. 123–131.
1874. Larva, pupa. *Boisduval,* (as Sph. brontes.) Spec. Gener. Sphingidæ, p. 116.
1877. Larva. *W. V. Andrews.* Psyche, vol. 2, p. 73.
1880. Larva. *J. Marten,* (as D. brontes.) Trans. Dept. Agr. Ill., vol. 18, Append., p. 102.
1880. Larva. *Coquillett,* (quotes Andrews.) Trans. Dept. Agr. Ill., vol. 18, Append., p. 159.
1882. Larva. *E. B. Reed.* 12th Rept. Entom. Soc. Ontario, p. 64.
1886. Life history. *Fernald.* Sphingidæ N. Engl'd, p. 28.
FOOD PLANT. *Fraxinus.*

Daremma catalpæ. Bois.
1874. Larva, pupa, (col'd figs.) *Boisduval,* (after Abbot.) Spec. Gener. Sphingidæ, p. 103, pl. 2.
1880. Larva. *J. Marten,* (quotes Boisduval.) Trans. Dept. Agr. Ill., vol. 18, Append., p. 104.
1881. Egg, larva. *A. Koebele.* Bull. Brooklyn Entom. Soc., vol. 4, p. 20.
1882. Life history, (figs.) *Riley.* Rept. U. S. Dept. Agr., pp. 192–193, pl. 13
FOOD PLANT. *Catalpa cordifolia.*

Diludia jasminearum. Bois.–Lec.
1859. Pupa, (brief.) *Clemens.* Jour. Acad. N. Sc. Philad., July.
1862. Pupa, (brief.) *Morris,* (quotes Clemens.) Synop. Lep. N. Amer., p. 199.
1874. Larva, pupa, (col'd fig.) *Boisduval.* Spec. Gener. Sphingidæ, p. 115, pl. 1.
1880. Larva. *J. Marten,* (quotes Boisduval.) Trans. Dept. Agr. Ill., vol. 18, Append., p. 103.
FOOD PLANT. *Fraxinus.*

Amphonyx antæus. Drury.
1719. Larva, pupa, (col'd figs.) *Madame Merian.* Ins. of Surinam, pl. 2.
1874. Larva, pupa. *Boisduval,* (quotes Mad. Merian.) Spec. Gener. Sphingidæ, p. 65.
1886. Larva, pupa. *Gundlach.* Entom. Cubana, p. 206.
1887. Pupa. *Hy. Edwards.* Entom. Amer., vol. 3, p. 161.
1888. Larva, (brief.) *J. B. Smith.* Monog. Sphing., p. 154
FOOD PLANT. Species of *Jatropha.*

Phlegethontius rustica. Fab.
1797. Larva, pupa, (col'd figs.) *Abbot—Smith.* Lep. Ins. Georgia, p. 67, pl. 34.
1858. Larva, (col'd fig.) *Duncan.* Natural. Library, vol. 22, p. 102, pl. 6.
1859. Larva, pupa. *Clemens.* Jour. Acad. N. Sc. Philad. (quotes Abbot), July.
1862. Larva, pupa. *Morris,* (quotes Clemens.) Synop. Lep. N. Amer., p. 187.
1874. Larva, pupa. *Boisduval.* Spec. Gener. Sphingidæ, p. 83.
1878. Larva, pupa. *H. Dewitz.* Wiegemann Archiv. Naturgesch., p. 10.
1886. Larva, pupa. *Gundlach.* Entom. Cubana, p. 209.
1887. Pupa. *Hy. Edwards.* Entom. Amer. vol. 3, p. 164.
FOOD PLANTS. *Chionanthus, Jasminium.*

Phlegethontius carolina. L.

1705. Larva, pupa, (col'd figs.) *Merian.* Matam. Ins. Surinam, p. 57, pl. 57.
1797. Larva, pupa, (col'd figs.) *Abbot—Smith.* Lep Ins. Georgia, p. 65, pl. 33.
1828. Larva, (col'd fig.) *Curtis.* British Entom., vol. 5, pl. 195.
1828. Larva, pupa, (brief.) *Stephens,* (quotes Abb.–Sm.) Illus. Brit. Entom., vol. 1, p. 118.
1837. Larva, pupa. *Westwood,* (quotes Abb.–Sm.) in Drury. Illus. Exot. Entom., vol. 1, p. 47.
1839. Larva, pupa. *Harris.* Silliman's Jour. Sc. Art, vol. 36, p. 294.
1852. Larva, pupa. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 246.
1859. Larva, pupa. *Clemens.* Jour. Acad. Sc. Philad., July.
1859. Pupa. *P. H. Gosse.* Letters from Alabama, p. 66.
1862. Larva, pupa. *Morris,* (quotes Clemens.) Synop. Lep. N. Amer., p. 189.
1862. Larva, pupa, (figs.) *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 322.
1869. Larva. *Harris.* Entom. Corres., p. 126, (quotes Doubleday lit.)
1869. Larva. *Harris.* Loc. cit., p. 282.
1873. Larva, pupa, (figs.) *T. Glover.* Rept. U. S. Dept. Agr., p. 157.
1874. Larva. *Boisduval,* (after Abbot.) Spec. Gener. Sphingidæ, p. 70.
1874. Larva. *Boisduval,* (var. lycopersici.) Loc. cit., p. 72.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 168.
1878. Larva, pupa. *H. Dewitz.* Wiegemann Archiv. Naturgesch., p. 12.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 103.
1880. Larva. *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 158.
1882. Larva. *J. Leidy.* Proc. Acad. N. Sc. Philad., p. 237.
1885. Larva, pupa, (fig.) *Fernald.* Kingsley's Stand. N. Hist., vol. 2, pp. 464–468.
1886. Larva. *Fernald.* Sphingidæ N. Engl'd, p. 32.
1886. Larva, pupa. *Gundlach.* Entom. Cubana, p. 210.

Food Plants. Various species of *Solanum, Datura, etc.*

Phlegethontius celeus. Hübn.

1841. Larva, pupa. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 226.
1852. Larva, pupa, (brief.) *Harris.* Ins. Inj. Vegetat., 2d edit., p. 247.
1859. Larva, pupa. *Clemens.* Jour. Acad. N. Sc. Philad., July.
1859. Larva. *Jaeger.* Life N. Amer. Ins., p. 189.
1862. Larva, pupa. *Morris,* (quotes Clemens.) Synop. Lep. N. Amer., p. 190.
1862. Larva, pupa, (figs.) *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 320.
1863. Larva, puga, (figs.) *Fitch.* 9th Rept. Ins. N. York, p. 778.
1864. Larva, pupa. *Lintner.* Proc. Entom. Soc. Philad., vol. 3, p. 648.
1867. Larva, pupa, (fig.) *S. Tenney.* Manual N. History, p. 392.
1869. Larva, pupa, (figs.) *Riley.* 1st Missouri Rept., p. 95.
1870. Larva, (fig.) *T. Glover.* Rept. U. S. Dept. Agr., p. 80.
1871. Larva, pupa, (figs.) *E. B. Reed.* Rept. Entom. Soc. Ontario, p. 419.
1873. Larva, pupa, (figs.) *A. J. Cook.* 12th Rept. State Board Agr. Michigan, p. 117.
1874. Larva. *Boisduval,* (after Abbot.) Spec. Gener. Sphingidæ, p. 76.
1874. Larva. *Gentry.* Canad. Entom., vol. 6, p. 88.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 169.
1877. Larva, pupa, (fig.) *Packard.* Inj. Ins. West, Hayden's Rept., p. 780.
1877. Larva, pupa, (figs.) *Packard.* Half-hours with Insects, p. 205.
1879. Larva, pupa, (figs.) *Mrs. Ballard.* Insect Lives, p. 95.
1880. Larva, pupa, (figs.) *Bethune.* Rept. Entom. Soc. Ontario, p. 25.
1880. Larva, pupa, (figs.) *Bethune.* Canad. Entom., vol. 12, p. 101.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 101.
1882. Larva, pupa, (figs.) *E. B. Reed.* 12th Rept. Entom. Soc. Ontario, p. 65.
1885. Larva. *Lintner.* Rept. Massachusetts Board Agr., p. 180.
1886. Larva. *Fernald.* Sphingidæ N. Engl'd, p. 34.

Food Plants. *Solanum, Nicotiana, Datura, etc.*

Phlegethontius cingulata. Fabr.

1797. Larva, pupa, (figs.) *Abbot—Smith.* Lep. Ins. Georgia, p. 63, pl. 32.
1837. Larva, pupa. *Westwood,* (quotes Abb.–Sm.) Drury's Illus. Exot. Entom., vol. 1, p. 50.
1839. Larva, pupa. *Harris,* (quotes Abb.–Sm.) Silliman's Jour. Sc. Art, vol. 36, p. 294.
1859. Larva, pupa. *Clemens,* (quotes Abb.–Sm.) Jour. Acad. N. Sc. Philad., July.
1862. Larva, pupa. *Morris,* (quotes Clemens.) Synop. Lep. N. Amer., p. 189.
1864. Larva, pupa. *Lintner.* Proc. Entom. Soc. Philad., vol. 3, p. 650.
1869. Larva. *Harris,* (as Sph. convolvuli.) Entom. Corres., p. 282.
1874. Larva, pupa. *Boisduval.* Spec. Gener. Sphingidæ, p. 96.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 104.
1880. Larva. *Coquillett,* (quotes Ab.–Sm.) Trans. Dept. Agr. Ill., vol. 18, Append., p. 158.
1886. Larva, pupa. *Fernald.* Sphingidæ N. Engl'd, p. 36.
1886. Larva, pupa. *Gundlach.* Entom. Cubana, p. 212.

FOOD PLANT. *Convolvulus batatas.*

Sphinx drupiferarum. Abb.–Sm.

1797. Larva, pupa, (col'd figs.) *Abbot—Smith.* Lep. Ins. Georgia, p. 71, pl. 36.
1839. Larva, pupa. *Harris,* (quotes Abb.–Sm.) Silliman's Jour. Sc. Art, vol. 36, p. 294.
1856. Larva. *Fitch.* 3d Rept. Ins. N. York, p. 362.
1859. Larva, pupa. *Clemens.* Jour. Acad. N. Sc. Philad., July.
1862. Larva, pupa. *Morris,* (quotes Clemens.) Synop. Lep. N. Amer., p. 197.
1864. Larva, pupa. *Lintner.* Proc. Entom. Soc. Philad., vol. 3, p. 658.
1871. Egg, larval stages, pupa, (figs.) *E. B. Reed.* Canad. Entom., vol. 3, p. 5.
1871. Larva, pupa, (figs.) *E. B. Reed.* Rept. Entom. Soc. Ontario, p. 362.
1874. Larva, pupa. *Boisduval,* (quotes Abb.–Sm.) Spec. Gener. Sphingidæ, p. 98.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 104.
1882. Larva, pupa, (figs.) *E. B. Reed.* 12th Rept. Entom. Soc. Ontario, p. 67.
1883. Larva, (brief.) *Ph. Fischer.* Canad. Entom., vol. 15, p. 238.
1883. Egg, larval stages, pupa, (figs.) *Saunders.* Ins. Inj. Fruits, p. 163.
1886. Egg, larva, pupa, (figs.) *Fernald.* Sphingidæ N. Engl'd, p. 40.

FOOD PLANTS. *Prunus, Celtis.*

Sphinx kalmiæ. Abb.–Sm.

1797. Larva, pupa, (col'd figs.) *Abbot—Smith.* Lep. Ins. Georgia, p. 73, pl. 37.
1839. Larva. *Harris,* (quotes Abb.–Sm.) Silliman's Jour. Sc. Art, vol. 36, p. 295.
1840. Egg, young larva. *P. H. Gosse.* Canad. Naturalist, p. 260.
1859. Larva, pupa. *Clemens,* (quotes Abb.–Sm.) Jour. Acad. N. Sc. Philad., July.
1862. Larva, pupa. *Morris,* (quotes Clemens.) Synop. Lep. N. Amer., p. 196.
1864. Larva, pupa. *Lintner.* Proc. Entom. Soc. Philad., vol. 3, p. 657.
1874. Larva, pupa. *Boisduval.* Spec. Gener. Sphingidæ, p. 92.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 104.
1882. Larva. *E. B. Reed.* 12th Rept. Entom. Soc. Ontario, p. 68.
1886. Larva, pupa. *Fernald.* Sphingidæ N. Engl'd, p. 41.

FOOD PLANTS. *Kalmia, Chionanthus, Syringa, Fraxinus.*

Sphinx chersis. Hübn.

1864. Larva, pupa. *Lintner.* Proc. Entom. Soc. Philad., vol. 3, p. 655.
1869. Larva. *Harris.* Entom. Corres., p. 282.
1877. Larva. *Scudder.* Psyche. vol. 2, p. 76.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 105.
1882. Larva. *E. B. Reed.* 12th Rept. Entom. Soc. Ontario, p. 65.
1883. Larva. *Edwards—Elliot.* Papilio, vol. 3, p. 127.

1886. Larva, pupa. *Fernald.* Sphingidæ N. Engl'd, p. 42.
FOOD PLANT. *Syringa.*

Sphinx gordius. Cramer.
1839. Larva. *Harris.* Silliman's Jour. Sc. Art, vol. 36, p. 295.
1856. Larva. *Fitch.* 3d Rept. Ins. N. York, p. 341.
1859. Larva, pupa. *Clemens.* Jour. Acad. N. Sc. Philad., July.
1862. Larva, pupa. *Morris.* Synop. Lep. N. Amer., p. 198.
1877. Larva. *Packard.* Half-hours with Insects, p. 180.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 105.
1883. Larva, pupa, (brief.) *Saunders.* Ins. Inj. Fruits, p 86.
1886. Larva. *Fernald.* Sphingidæ N. Engl'd, p. 45.
FOOD PLANT. *Pyrus.*

Sphinx lugens. Walk.
1875 Larva, pupa. *F. H. Snow.* Trans. Kansas Acad. Sc., vol. 4, p. 28.

Sphinx eremitus. Hübn.
1870. Larva, (fig.) *T. Glover.* Rept. U. S. Dept. Agr., p. 80.
1879. Larva. *T. W. Tyler.* Canad. Entom., vol. 11, p. 59.
1882. Larva. *E. B. Reed.* 12th Rept. Entom. Soc. Ontario, p. 69.
1886. Larva, pupa. *Fernald.* Sphingidæ N. Engl'd, p. 47.
FOOD PLANTS. *Mentha, Monarda, Salvia.*

Sphinx elsa. Strecker.
1888. Larva. *Hy. Edwards.* Entom. Amer., vol. 4, p. 61.

Sphinx luscitiosa. Clem.
1888. Larval stages, pupa. *Caroline G. Soule.* Psyche, vol. 5, p. 85.

Dolba hylæus. Drury.
1797. Larva, pupa, (col'd figs.) *Abbot—Smith.* Lep. Ins. Georgia, p. 69, pl. 35.
1837. Larva, pupa. *Westwood,* (quotes Abb.–Sm.) *Drury.* Illus. Exot. Entom., vol. 2, p. 49.
1839. Larva. *Harris,* Silliman's Jour. Sc. Art, vol. 36, p. 296.
1859. Larva, pupa. *Clemens,* (quotes Abb.–Sm.) Jour. Acad. N. Sc. Philad., July.
1862. Larva, pupa. *Morris,* (quotes Clemens.) Synop. Lep. N. Amer., p. 204.
1874. Larva, pupa. *Boisduval.* Spec. Gener. Sphingidæ, p. 99.
1882. Larva. *E. B. Reed.* 12th Rept. Entom. Soc. Ontario, p. 70.
1884. Larva. *W. H. Harrington.* Canad. Entom., vol. 16, p. 55.
1886. Larva. *Fernald.* Sphingidæ N. Engl'd, p. 49.
FOOD PLANT. *Prinos.*

Dilophonota ello. L.
1719. Larva, pupa, (col'd figs.) *Madame Merian.* Ins. Surinam.
1839. Larva. *Harris,* (quotes Mad. Merian.) Silliman's Jour. Sc. Art, vol. 36, p. 297.
1859. Larva, pupa. *Clemens,* (quotes Mad. Merian.) Jour. Acad. N. Sc. Philad.
1862. Larva, pupa. *Morris,* (quotes Clemens.) Synop. Lep. N. Amer., p. 201.
1874. Larva. *Boisduval,* (after Merian.) Spec. Gener. Sphingidæ, p. 120.
1886. Egg, larva. *W. J. Holland.* Canad. Entom., vol. 18, p. 103.
1886. Larva, pupa. *Gundlach.* Entom. Cubana, p. 223.
1887. Larval stages, pupa. *Hy. Edwards.* Entom. Amer., vol. 3, p. 166.
FOOD PLANT. *Psidium.*

Anceryx edwardsii. Butler.
1887. Larval stages, pupa. *Hy. Edwards.* Entom. Amer., vol. 3, p. 165.

Hyloicus plebeius. Fabr.
1874. Larva, (col'd fig.) pupa. *Boisduval,* (after Abbot's drawing.) Spec. Gener. Sphingidæ, p. 100, pl. 1.
1877. Larva. *Scudder.* Psyche, vol. 2, p. 78.
1886. Larva. *Fernald.* Sphingidæ N. Engl'd, p. 53.
FOOD PLANTS. *Bignonia, Passiflora.*

Hyloicus cupressi. Bois.

1874. Larva, pupa, (col'd figs.) *Boisduval*, (after Abbot's drawing.) Spec. Gener. Sphingidæ, p. 102, pl. 2.

FOOD PLANT. *Cupressus thyoides.*

Ellema coniferarum. Abb.-Sm.

1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 83, pl. 42.
1839. Larva. *Harris*, (after Abbot.) Silliman's Jour. Sc. Art, vol. 36, p. 297.
1840. Larva, (brief.) *Westwood.* Intr. Mod. Class. Ins., vol. 2, p. 367.
1858. Larva, (brief.) *Fitch.* 4th Rept. Ins. N. York, p. 742.
1859. Larva. *Clemens.* Jour. Acad. N. Sc. Philad. (quotes Abb.-Sm.), July.
1862. Larva. *Morris*, (quotes Clemens.) Synop. Lep. N. Amer., p. 199.
1874. Larva, pupa. *Boisduval*, (after Abbot.) Spec. Gener. Sphingidæ, p. 105.
1880. Larva. *J. Marten*, (quotes Fitch, Abb.-Sm.) Trans. Dept. Agr. Ill., vol. 18, Append., p. 105.
1881. Egg, larva. *A. Koebele.* Bull. Brooklyn Entom. Soc., vol. 4, p. 20.
1881. Larva, (brief.) *Packard.* Ins. Inj. Forest Trees, p. 201.
1886. Egg, larva. *Fernald.* Sphingidæ N. Engl'd, p. 85.
1887. Pupa. *Hy. Edwards.* Entom. Amer., vol. 3, p. 167.

FOOD PLANT. *Pinus palustris.*

Ellema bombycoides. Walk.

1859. Larva, (brief.) *Clemens.* Jour. Acad. N. Sc. Philad., July.
1862. Larva, (brief.) *Morris*, (quotes Clemens.) Synop. Lep. N. Amer., p. 216.
1864. Larva, pupa. *Lintner.* Proc. Entom. Soc. Philad., vol. 3, p. 669.
1869. Larva, pupa, (figs.) *Lintner.* 23d Rept. N. York State Cab. N. Hist., p. 171.
1869. Larva. *Packard.* Guide to Study of Insects, p. 272.
1874. Larva, pupa. *Boisduval.* Spec. Gener. Sphingidæ, p. 106.
1877. Larva. *W. V. Andrews.* Psyche, vol. 2, p. 79.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 105.
1881. Larva, pupa. *Packard*, (quotes Lintner.) Ins. Inj. Forest Trees, p. 202.
1882. Larva. *E. B. Reed.* 12th Rept. Entom. Soc. Ontario, p. 70.
1886. Larva. *Fernald.* Sphingidæ N. Engl'd, p. 84.

FOOD PLANT. *Pinus* of various species.

Ellema pineum. Lintn.

1869. Larva. *Lintner.* 23d Rept. N. York State Cab. N. Hist., p. 170.
1874. Larva. *Boisduval*, (quotes Lintner.) Spec. Gener. Sphingidæ, p. 107.
1880. Larva. *J. Marten*, (quotes Lintner.) Trans. Dept. Agr. Ill., vol. 18, Append., p. 105.
1881. Larva. *Packard*, (quotes Lintner.) Ins. Inj. Forest Trees, p. 202.

FOOD PLANT. *Pinus strobus.*

ÆGERIADÆ.

Melittia ceto. Westw.=**cucurbitæ.** Harr.

1828. Larva. *Harris.* N. Engl'd Farmer, vol. 7, p. 33.
1839. Larva, cocoon, pupa. *Harris*, (as Aeg. cucurbitæ.) Silliman's Jour. Sc. Art, vol. 36.
1842. Larva. *Harris.* N. Engl'd Farmer, vol. 20, p. 260.
1852. Pupa, cocoon, (brief.) *Harris.* Ins. Inj. Vegetat., 2d edit., p. 252.
1862. Larva, cocoon, pupa. *Morris*, (quotes Harris.) Synop. Lep. N. Amer., p. 139.
1862. Larva, cocoon, (figs.) *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 331.
1869. Larva. *Harris.* Entom. Corres., p. 284.
1871. Larva, cocoon, (figs) *E. B. Reed.* Rept. Entom. Soc. Ontario, p. 429.
1874. Larva. *Boisduval*, (after Abbot.) Spec. Gener. Sphingidæ, p. 470.
1877. Larva, (fig.) *Packard.* Inj. Ins. West, Hayden's Rept., p. 769.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 173.

1880. Larva, cocoon. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 107.
1883. Egg, (brief.) *Saunders.* Ins. Inj. Fruits, p. 361.
1883. Larva, pupa, (figs.) *Saunders.* Loc. cit., p. 361.
1885. Larva, cocoon, (figs.) *Lintner,* (quotes Harris.) 2d Rept. State Entom. N. York, p. 59.
1885. Larva, pupa. *Scudder.* Psyche, vol. 4, p. 303.
FOOD PLANTS. *Cucurbitaceæ* of various species.

Alcathoe caudatum. Harris.
1839. Larva, (brief.) *Harris.* Silliman's Jour. Sc. Art, vol. 36.
1862. Larva, (brief.) *Morris,* (quotes Harris.) Synop. Lep. N. Amer., p. 139.
1856. Larva. *Fitch.* 3d Rept. Ins. N. York, p. 424.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 172.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 108.
FOOD PLANTS. *Ribes, Clematis,* (stems.)

Trochilium apiforme. L.
1828. Larva, pupa. *Stephens.* Illus. Brit. Entom., Haust., vol. 1, p. 137.
1836. Larva. *J. Duncan.* Natural. Library, vol. 4, Entom., p. 173.
1840. Larva, pupa, (col'd figs.) *Ratzeburg.* Die Forst-Insecten, vol. 2, p. 73, pl. 3, 4.
1848. Larva, (col'd fig.) *Humphreys.* Genera British Moths, p. 13, pl. 4.
1857. Larva. *Stainton.* Manual Brit. Butt. and Moths, p. 102.
1872. Larva, (brief.) *J. G. Wood.* Insects at Home, p. 427.
1872. Larva. *Figuier.* Insect World (Duncan's edit.), p. 193.
1874. Larva, cocoon, pupa, (figs.) *P. M. Duncan.* Transfor. of Ins., p. 95.
1882. Larva. *W. F. Kirby.* Europ. Butt. and Moths, p. 77.
FOOD PLANTS. Trunks of *Willow* and *Poplar.*

Fatua denudata. Harris.
1852. Pupa, (brief.) *Harris.* Ins. Inj. Vegetat., 2d edit., p. 252.
1862. Pupa, (brief.) *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 330.
FOOD PLANT. *Fraxinus,* (stems and trunk.)

Bembecia marginata. Harris.
1874. Larva. *Riley,* (as Æg. rubi.) 6th Missouri Rept., p. 113.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 175.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., p. 18, Append., p. 108.
1881. Larva. *Riley.* Suppl. Missouri Rept's, p. 72.
1883. Egg. *G. D. Hulst.* Bull. Brooklyn Entom. Soc., vol. 6, p. 8.
FOOD PLANT. Stems of *Rubus.*

Sciapteron tricincta. Harris.
1881. Larva, (brief.) *D. S. Kellicott.* Bull. Buffalo Soc. N. Sc., p. 62.
1881. Larva, pupa. *D. S. Kellicott.* Canad. Entom., vol. 13, p. 3.
1881. Larva. *Packard,* (quotes Kellicott.) Ins. Inj. Forest Trees, p. 121.
FOOD PLANT. *Populus candicans,* (stems.)

Sciapteron polistiformis. Harris.
1854. Larva, cocoon, pupa, (brief.) *Harris.* Rept. on Ins. Inj. Vegetat. Trans. Amer. Pomological Soc., p. 10.
1856. Larva. *Fitch.* 3d Rept. Ins. N. York, p. 387.
1861. Larva, cocoon, (figs.) *T. Glover.* Rept. N. York State Board Agr., p. 72.
1869. Larval stages, pupa. *B. D. Walsh.* 1st Illinois Rept., p. 24.
1871. Larva. *Riley.* 3d Missouri Rept., p. 76.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 171.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 108.
1883. Larva, cocoon, (figs.) *Saunders.* Ins. Inj. Fruits, p. 229.
FOOD PLANT. *Vitis,* (stem and roots.)

Sciapteron anthracipennis. Boisd.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 109.
FOOD PLANT. *Salix,* (stems.)

Harmonia pini. Kellicott.

1881. Larva, pupa. *D. S. Kellicott.* Canad. Entom., vol. 13, p. 6.
1881. Larva, pupa. *Packard,* (quotes Kellicott.) Ins. Inj. Forest Trees, p. 180.
FOOD PLANT. *Pinus,* (trunk and stem.)

Podosesia syringæ. Harris.

1839. Larva. *Harris.* Silliman's Jour. Sc. Art, vol. 36.
1870. Larva. *Packard.* Inj. Ins., new or little known, p. 18.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 174.
1880. Larva, pupa. *Herbert Osborn.* Trans. Iowa Hortic. Soc., vol. 15, p. 107.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 10[illegible].
1881. Larva. *Hy. Edwards.* Papilio, vol. 1, p. 184.
1882. Life history, (fig.) *G. D. Hulst.* Bull. Brooklyn Entom. Soc., vol. 5, p. 17.
FOOD PLANTS. *Fraxinus, Syringa,* (trunk and stem.)

Sannina exitiosa. Say.

1825. Pupa, cocoon. *Say.* Amer. Entom., vol. 2, pl. 19.
1826. Larva. *Harris.* N. Engl'd Farmer, vol. 5, p. 33.
1839. Larva. *Harris.* Silliman's Jour. Sc. Art, vol. 36.
1843. Egg, larva. *Willis Gaylord.* Trans. N. York Agr. Soc., p. 161.
1854. Larva, cocoon. *Emmons.* Nat. Hist. N. York, vol. 5, p. 223.
1854. Egg, larva, pupa. *Fitch.* 1st Rept. Ins. N. York, pp. 108–116.
1856. Larva. *Fitch.* 3d Rept. Ins. N. York, p. 356
1859. Larva, pupa. *P. H. Gosse.* Letters from Alabama, p. 146.
1862. Larva. *Morris,* (quotes Harris.) Synop. Lep. N. Amer., p. 140.
1862. Larva, pupa, (figs.) *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 331.
1865. Larva. *B. D. Walsh.* Practical Entom., p. 67.
1869. Larva. *Riley.* 1st Missouri Rept., p. 47.
1871. Larva. *Saunders.* Canad. Entom., vol. 3, p. 22.
1873. Larva, pupa. *A. J. Cook.* 12th Rept. Michigan Board Agr., p. 136.
1876. Egg, larva. *Cyrus Thomas.* Trans. Dept. Agr. Ill., vol. 14, p. 38.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 179.
1879. Egg. *J. H. Comstock.* Rept. U. S. Dept. Agr., p. 254.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 107.
1883. Egg, larva, pupa, (fig.) *Saunders.* Ins. Inj. Fruits, p. 192.
1884. Egg, larva, cocoon, (fig.) *T. J. Edge.* Rept. Agr. Pennsylv., p. 104.
1885. Egg, larva. *Fernald.* Kingsley's Stand. N. Hist., vol. 2, p. 464.
FOOD PLANT. *Persica,* (peach trees.)

Ægeria pictipes. G. and R.

1879. Life history, (figs.) *J. S. Bailey.* N. Amer. Entom., vol. 1, p. 17.
1880. Larva, pupa, (fig.) *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 109.
FOOD PLANT. *Prunus,* (trunk and stem.)

Ægeria pyri. Harris.

1839. Larva. *Harris.* Silliman's Jour. Sc. Art, vol. 36.
1856. Larva. *Fitch* 3d Rept. Ins. N. York, p. 349.
1862. Larva. *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 335.
1862. Larva, (brief.) *Morris,* (quotes Harris.) Synop. Lep. N. Amer., p. 141.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 170.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 107.
FOOD PLANT. *Pyrus,* (trunk and stem.)

Ægeria acerni. Clem.

1874. Larva, cocoon, pupa, (figs.) *Riley.* 6th Missouri Rept., pp. 107–110.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 173.
1880. Larva, cocoon, (figs.) *J. Marten,* (after Riley.) Trans. Dept. Agr. Ill., vol. 18, Append., p. 108.
1881. Larva, (fig.) *Packard,* (quotes Riley.) Ins. Inj. Fruits, p. 107.
1881. Life history. *Saunders.* Canad. Entom., vol. 13, p. 69.

1882. Life history, (brief.) *Saunders.* 12th Rept. Entom. Soc. Ontario, p. 20.
FOOD PLANT. *Acer*, (stems.)

Ægeria tipuliformis. L.

1828. Larva. *Stephens.* Illus. Brit. Entom., Haust., vol. 1, p. 142.
1839. Larva. *Harris.* Silliman's Jour. Sc. Art, vol. 36.
1848. Larva, (col'd fig.) *Humphreys.* Gener. Brit. Moths, p. 13, pl. 4.
1851. Larva. *Harris.* Hovey's Magaz. Hortic , vol. 17, p. 241.
1856. Larva. *Fitch.* 3d Rept. Ins. N. York, p. 423.
1857. Larva. *Stainton.* Manual Brit. Butt. and Moths, p. 106.
1862. Larva. *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 334.
1865. Larva. *B. D. Walsh.* Practical Entom., p. 29.
1871. Life history, (brief.) *Saunders.* Rept. Entom. Soc. Ontario, p. 381.
1872. Larva, (brief.) *J. G. Wood.* Insects at Home, p. 427.
1873. Larva, cocoon. *A. J. Cook.* 12th Rept. Board Agr. Michigan, p. 140.
1879. Egg, larva. *Saunders.* Rept. Entom. Soc. Ontario, p. 76.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 107.
1880. Larva. *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 151.
1882. Larva, (col'd fig.) *W. F. Kirby.* Europ. Butt. and Moths, p. 78, pl. 20
1883. Life history, (brief.) *Saunders.* Ins. Inj. Fruits, p. 336.
1885. Life history, (figs.) *Lintner.* 2d Rept. State Entom. N. York, p. 60.
1888. Larva, pupa, (figs.) *Bethune.* 18th Rept. Entom. Soc. Ontario, p. 54.
FOOD PLANT. *Ribes*, (stems.)

Ægeria prosopis. Hy. Edw.

1882. Gall. *Hy. Edwards.* Papilio, vol. 2, p. 99.
FEEDS in stems of *Prosopis*, making a gall.

Ægeria hemizoniæ. Hy. Edw.

1883. Larva. *J. J. Rivers.* Papilio, vol. 3, p. 26.
FOOD PLANT. *Rubus*, (root and stems.)

THYRIDÆ.

Thyris vitrina. Boisd.

1829. Larva. *Boisduval*, (after Abbot's drawing.) Monogr. Zygænidæ, p. 19.
1874. Larva. *Boisduval*, (after Abbot's drawing.) Spec. Gener. Sphingidæ, p. 490.
FOOD PLANT. *Phaseolus.*
NOTE.—This insect appears to be unknown to American entomologists.

ZYGÆNIDÆ.

Alypia octomaculata. Fabr.

1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 87, pl. 44.
1839. Larva. *Harris.* Silliman's Jour. Sc. Art, vol. 36, p. 314.
1854. Larva, (col'd fig.) *Emmons*, (after Abb.–Sm.) Nat. Hist. N. York, vol. 5, pl. 38.
1854. Larva. *Harris.* Rept. Ins. Inj. Vegetat. Trans. Amer. Pomological Soc., p. 10.
1856. Larva. *Fitch.* 3d Rept. Ins. N. York, p. 399.
1862. Larva. *Morris.* Synop. Lep. N. Amer , p. 132.
1865. Pupa. *Packard.* Notes on Zygænidæ, Proc. Essex Inst., vol. 4, p. 24.
1868. Larva. *W. V. Andrews.* Amer. Naturalist, vol. 2, p. 666.
1869. Larva, (fig.) *Riley.* 1st Missouri Rept., p. 136, pl. 1.
1869. Larva. *Harris.* Entom. Corres., p. 285.
1870. Life history, (figs.) *Riley.* 2d Missouri Rept., p. 80, fig. 55.
1872. Larva. *Lintner*, (quotes Harris.) 26th Rept. N. York State Cab. N. Hist., p. 120.
1873. Larva, (col'd fig.) *Stretch.* Zygæn. Bombyc. N. Amer., pl. 10.
1874. Larva, (fig.) *Riley.* 6th Missouri Rept., p. 94.

1874. Larva, (fig.) *J. G. Wood.* Insects Abroad, p. 651.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 176.
1877. Larva, (figs.) *Packard.* Inj. Ins. West, Hayden's Rept., p. 785.
1878. Larva, (fig.) *G. H. Perkins.* 5th Rept. Vermont Board Agr., p. 276.
1880. Larva, (fig.) *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 110.
1880. Larva, (fig.) *Coquillett,* (quotes Riley.) Trans. Dept. Agr. Ill., vol. 18, Append., p. 172.
1881. Larva, (brief.) *W. W. Goldsmith,* (quotes Riley.) Kentucky Bureau Agr., p. 255.
1883. Larva, pupa, (figs.) *Saunders.* Ins. Inj. Fruits, p. 263.
1885. Larva. *Fernald.* Kingsley's Stand. N. Hist., vol. 2, p. 463.

FOOD PLANTS. *Vitis, Ampelopsis.*

Psychomorpha epimenis. Drury.

1869. Larva, (brief.) *Doubleday,* (quotes Abbot in lit.) Harris's Entom. Corres., p. 130.
1871. Larva, pupa, (figs.) *Riley* 3d Missouri Rept., p. 64.
1872. Larva, (fig.) *Lintner.* 26th Rept. N. York State Cab. N. Hist., p. 121.
1873. Larva, (brief, col'd fig.) *Stretch.* Zygæn. Bombyc. N. Amer., p. 18, pl. 10.
1874. Larva, pupa, (figs.) *Riley.* 6th Missouri Rept., p. 88.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 177.
1880. Larva, pupa, (figs.) *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 111.
1880. Larva, (fig.) *Coquillett,* (quotes Lintner.) Trans. Dept. Agr. Ill., vol. 18, Append., p. 172.
1883. Larva, pupa, (figs.) *Saunders.* Ins. Inj. Fruits, p. 264.

FOOD PLANTS. *Bignonia radicans, Vitis.*

Euscirrhopterus gloveri. Grote.

1887. Life history. *E. A. Popenoe.* The Industrialist, Oct. 1, (quoted in Entom. Amer.), vol. 3, p. 178.
1888. Larva, pupa, (figs.) *Riley.* Insect Life, vol. 1, p. 104.

FOOD PLANT. *Portulaca.*

Eudryas unio. Hübn.

1856. Larva. *Fitch.* 3d Rept. Ins. N. York, p. 399.
1861. Pupa, (brief.) *J. Kirkpatrick.* Proc. Entom. Soc. Philad., p. 43.
1868. Larva, pupa. *J. Kirkpatrick.* Ohio Farmer, Feb. 8.
1870. Larva, (fig.) *Riley.* 2d Missouri Rept., p. 83, (in error for P. epimenis.)
1873. Larva, (brief.) *Stretch.* Zygæn. Bombyc. N. Amer. p. 150.
1874. Larva. *Lintner.* 26th Rept. N. York State Cab. N. Hist., p. 118.
1874. Larva. *Riley,* (quotes Lintner.) 6th Missouri Rept., p. 92.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 178.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 111.
1880. Larva. *Coquillett,* (quotes Lintner.) Trans. Dept. Agr. Ill., vol. 18, Append., p. 173.
1881. Larva, (brief.) *D. S. Kellicott.* Bull. Buffalo Soc. N. Sc., vol. 4, p. 29.
1883. Larva, pupa. *Saunders.* Ins. Inj. Fruits, p. 262.

FOOD PLANT. *Vitis.*

Eudryas grata. Fabr.

1841. Larva. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 310.
1852. Larva. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 329.
1856. Larva. *Fitch.* 3d Rept. Ins. N. York, p. 399.
1859. Larva. *Clemens.* Jour. Acad. N. Sc. Philad., July.
1862. Larva, (figs.) *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 427.
1862. Larva. *Morris,* (quotes Harris.) Synop. Lep. N. Amer., p. 246.
1864. Larva, pupa, (figs.) *Packard.* Notes on Zygæn. Proc. Essex Inst., vol. 4, p. 27.
1869. Larva. *Harris.* Entom. Corres., p. 306.

1869. Larva. *Packard.* Guide to Study of Insects, p. 281.
1870. Larva, pupa, (figs) *Riley.* 2d Missouri Rept., p. 83.
1874. Egg, larva, (figs.) *Lintner.* 26th Rept. State Cab. N. Hist., p. 123.
1874. Egg, larva, pupa, (figs.) *Riley.* 6th Missouri Rept., p. 89.
1875. Life history, (figs.) *Saunders.* Canad. Entom., vol. 7, p. 41.
1875. Egg, larva, pupa, (figs.) *Saunders.* Rept. Entom. Soc. Ontario, p. 38.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 178.
1880. Egg, larva, (figs.) *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 111.
1880. Egg, larva, (figs.) *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 173.
1883. Egg, larva, pupa, (figs.) *Saunders.* Ins. Inj. Fruits, p. 259.
1885. Egg, larva. *Fernald.* Kingsley's Stand. N. Hist., vol. 2, p. 462.
1888. Egg, larva, (figs.) *Fletcher.* Rept. Entom. Dept. Agr. Canad., p. 30.

FOOD PLANTS. *Vitis, Ampelopsis.*

Cosmosoma omphale. Hübn.

1886. Larva, cocoon. *Gundlach.* Entom. Cubana, p. 239.
1886. Pupa, cocoon. *J. B. Smith.* Entom. Amer., vol. 1, p. 186.

FOOD PLANT. *Mikania.*

Scepsis edwardsii. Grote.

1887. Larva. *Hy. Edwards.* Entom. Amer., vol. 3, p. 167.

Scepsis fulvicollis. Hübn.

1880. Larva. *Coquillett.* Canad. Entom., vol. 12, p. 44.
1880. Larva. *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 171.

FOOD PLANTS. *Grasses.*

Ctenucha virginica. Charp.

1862. Larva, cocoon, (brief.) *Packard.* 7th Rept. Maine Board Agr., p. 168.
1864. Egg, larva, cocoon, pupa, (figs.) *Packard.* Notes on Zygæn. Proc. Essex Inst., vol. 4, p. 36.
1872. Larva, cocoon. *Lintner.* 26th Rept. N. York State Cab. N. Hist., p. 155.
1873. Larva, cocoon. *Stretch,* (quotes Packard.) Zygæn. Bombyc. N. Amer., p. 26.
1877. Larva, pupa, (col'd figs.) *Packard.* Half-hours with Insects, (frontisp.)
1880. Larva. *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 170.

FOOD PLANTS. *Grasses.*

Ctenucha multifaria. Walk.

1874. Egg, young larva, pupa. *Hy. Edwards.* Proc. Cal. Acad. Sc., p. 344.

Acoloithus falsarius. Clem.

1870. Larva, (fig.) *T. Glover.* Rept. U. S. Dept. Agr., p. 81.
1880. Larva, (brief.) *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 112.

FOOD PLANTS. *Vitis, Ampelopsis.*

Harrisina americana. Harris.

1839. Larva. *Harris.* Silliman's Jour. Sc. Art, vol. 36, p. 315.
1844. Life history, (figs.) *Harris.* Hovey's Magazine, June vol. 10, p. 201.
1852. Larva. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 257.
1856. Larva. *Fitch.* 3d Rept. Ins. N. York, p. 398.
1862. Larva, cocoon. *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 337.
1862. Larva, (brief.) *Packard.* Rept. Maine Board Agr., p. 168.
1870. Life history, (figs.) *Riley.* 2d Missouri Rept., p. 85.
1873. Larva, (col'd fig.) *Stretch.* Zygæn. Bombyc. N. Amer., pl. 10.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 179.
1880. Larva, cocoon. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 112.
1881. Larva, pupa, (brief.) *W. W. Goldsmith,* (quotes Riley.) Kentucky Bureau Agr., p. 255.

1883. Egg, larva, pupa, (figs.) *Saunders.* Ins. Inj. Fruits, p. 265.
1885. Larva, (fig.) *Fernald.* Kingsley's Stand. N. Hist., vol. 2, p. 462.
FOOD PLANTS. *Vitis, Ampelopsis.*

Lycomorpha pholus. Drury.
1839. Larva. *Harris.* Silliman's Jour. Sc. Art, vol. 36, p. 318.
1862. Larva. *Morris,* (quotes Harris.) Synop. Lep. N. Amer., p. 135.
1862. Larva, (brief.) *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 341.
1873. Larva. *Stretch,* (quotes Harris.) Zygæn. Bombyc. N. Amer., p. 42.
1885. Larva. *Fernald,* (quotes Harris.) Kingsley's Stand. N. Hist., vol. 2, p. 462.
FOOD PLANTS. *Lichens.*

Oeta aurea. Fitch.
1869. Larva, pupa, (figs.) *Riley.* 1st Missouri Rept., p. 151.
1873. Larva. *Stretch,* (quotes Riley.) Zygæn. Bombyc. N. Amer., p. 241.
1881. Egg. *Riley.* Papilio, vol. 1, p. 110.
FOOD PLANT. *Ailanthus.*

BOMBYCES.

Sub-fam. Nycteolidæ.

Sarrothripa reveyana. S. V.
1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths, vol. 2, p. 190.
1859. Larva, cocoon, pupa, (col'd figs.) *Humphreys.* Genera Brit. Moths, p. 49.
1882. Larva. *W. F. Kirby.* Europ. Butt. and Moths, p. 294.
FOOD PLANT. *Salix.*

Sub-fam. Lithosiidæ.

Nola ovilla. Grote.
1884. Larva, cocoon. *Packard.* Amer. Naturalist, vol. 18, p. 726.
FOOD PLANT. *Quercus.*

Nola sorghiella. Riley.
1882. Larva, pupa, (figs.) *Riley.* Rept. U. S. Dept. Agr., p. 187, pl. 11.

Hypoprepia fucosa. Hübn., (incl. vars.)
1841. Larva, pupa. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 241.
1852. Larva. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 262.
1862. Larva, cocoon. *Harris.* Ins Inj. Vegetat., Flint's edit., p. 342.
1862. Larva. *Morris,* (quotes Harris.) Synop. Lep. N. Amer., p. 256.
1871. Larva. *Saunders.* Canad. Entom., vol. 3, p. 36.
1873. Larva, cocoon. *Stretch,* (quotes Harris.) Zygæn. Bombyc. N. Amer., p. 47.
1880. Larva. *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 184.
1880. Larva. *Coquillett.* Canad. Entom., vol. 12, p. 45.
FOOD PLANT. *Lichens.*

Cisthene subjecta. Walk.
1881. Larva, pupa. *Mary E. Murtfeldt,* (as C. packardi.) Psyche, vol. 3, p. 243.
FOOD PLANT. *Lichens.*

Byssophaga nexa. Boisd.
1878. Egg, larva, pupa. *Hy. Edwards.* Proc. Cal. Acad. Sc., June.
FOOD PLANT. *Lichens.*

Eustixis pupula. Hübn.
1870. Larva, pupa, (fig.) *Packard,* (after Abbot's drawing.) Amer. Naturalist, vol. 4, p. 229.
FOOD PLANT. *Sideronytum tenax.*

Euphanessa mendica. Walk.
1871. Egg, larva. *Saunders.* Canad. Entom., vol. 3, p. 227.
1873. Egg, larva. *Stretch,* (quotes Saunders.) Zygæn. Bombyc. N. Amer., p. 53.
1886. Larva, pupa. *G. D. Hulst.* Entom. Amer., vol. 1, p. 167.

Sub-fam. **Dioptidæ.**

Phryganidea californica. Packard.

1873. Larva, pupa, (col'd figs.) *Stretch.* Zygæn. Bombyc. N. Amer., p. 91, pl. 10.
1874. Egg, larval stages. *Hy. Edwards.* Proc. Cal. Acad. Sc., Sept.
1877. Egg, larva. *Packard,* (quotes Hy. Edwards.) Inj. Ins. West, Hayden's Rept., p. 808.
1881. Egg, larva, pupa. *Packard,* (quotes Stretch and Hy. Edw.) Ins. Inj. Forest Trees, p. 43.

FOOD PLANT. *Quercus.*

Sub-fam. **Arctiidæ.**

Crocota quinaria. Grote.

1869. Larva. *Saunders,* (as Arct. bimaculata.) Canad. Entom., vol. 2, p. 4.

FOOD PLANTS. *Taraxacum, Chenopodium, etc.*

Utetheisa bella. L.

1870. Larva, pupa, (figs.) *T. Glover.* Rept. Dept. Agr., p. 80.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 113.
1883. Larva. *Edwards—Elliot.* Papilio, vol. 3, p. 128.
1886. Larva, pupa. *Gundlach.* Entom. Cubana, p. 258.

FOOD PLANTS. *Myrica, Lespedeza, Prunus, Crotalaria, etc.*

Callimorpha interrupto-marginata. De Beauv.

1878. Larva, (brief.) *C. G. Siewers.* Canad. Entom., vol. 10, p. 84.

Callimorpha confusa. Lyman.

1887. Life history. *H. H. Lyman.* Canad. Entom., vol. 19, p. 186.

FOOD PLANT. *Cynoglossum officinale.*

Callimorpha clymene. Esp.

1871. Larva, (brief.) *Riley.* 3d Missouri Rept., p. 134.

FOOD PLANT. *Quercus.*

Callimorpha lecontei. Boisd.

1868. Larva. *Saunders.* Canad. Entom., vol. 1, p. 20.
1871. Larva, pupa, (figs.) *Le Baron.* 2d Illinois Rept., p. 47.
1872 Larva. *Lintner.* 26th Rept. N. York State Cab. N. Hist., p. 142.
1873. Larva. *Stretch,* (quotes Saunders.) Zygæn. Bombyc. N. Amer., p. 64.
1877. Larva. *French,* (quotes Saunders.) Trans. Dept. Agr. Ill., vol. 15, p. 181.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 115.
1883. Larva, pupa, (fig.) *Saunders.* Ins. Inj. Fruits, p. 198.

FOOD PLANT. *Triosteum perfoliatum.*

Callimorpha fulvicosta. Clem.

1871. Larva, pupa, (figs) *Riley.* 3d Missouri Rept., p. 132.
1873. Larva, pupa. *Stretch,* (quotes Riley.) Zygæn. Bombyc. N. Amer., p. 64.
1877. Larva, (fig.) *French,* (after Riley.) Trans. Dept. Agr. Ill., vol. 15, p. 180.
1880. Larva, (fig.) *J. Marten,* (after Riley.) Trans. Dept. Agr. Ill., vol. 18, Append., p. 113.

FOOD PLANTS. *Pyrus, Prunus.*

Epicallia virginalis. Boisd.

1873. Larva, (brief.) *Packard.* Hayden's Survey Territ., p. 559.
1873. Larva, pupa, (col'd figs.) *Stretch.* Zygæn. Bombyc. N. Amer., p. 71, pl. 10.

FOOD PLANT. *Lupinus* of various species.

Platarctia parthenos. Harris.

1868. Larva. *Saunders.* Canad. Entom., vol. 1, p. 5.
1870. Egg, larval stages, cocoon. *Lintner.* 24th Rept. N. York State Cab. N. Hist., p. 132.
1871. Larva. *Saunders.* Canad. Entom , vol. 3, p. 225.

FOOD PLANTS. *Lactuca, etc.*

Euprepia americana. Harris.

1863. Larva. *Fitch.* 9th Rept. Ins. N. York, p. 801.
1863. Larva. *Saunders.* Canad. Journ., new series, vol. 8, p. 352.

1863. Larva. *Saunders.* Proc. Entom. Soc. Philad., vol. 2, p 28.
1866. Larva. *Packard.* Proc. Boston Soc. N. Hist., vol. 11, p. 34.
1869. Larva. *Harris.* Entom. Corres., p. 287.
1870. Egg, larval stages, *Lintner.* 24th Rept. N. York State Cab. N. Hist., p. 134.
1873. Larva. *Stretch.* Zygæn. Bombyc. N. Amer., p. 96.
1875. Life history. *R. Bunker.* Canad. Entom., vol. 7, p. 149.
1876. Larva, (brief.) *H. H. Lyman.* Canad. Entom., vol. 8, p. 20.
FOOD PLANTS. *Lactuca, etc.*

Arctia virgo. L.
1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 123, pl. 62.
1840. Larva, cocoon, (brief.) *P. H. Gosse.* Canad. Naturalist, p. 222.
1841. Larva. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 244.
1852. Larva. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 265.
1854. Larva. *Emmons.* Nat. Hist. N. York, vol. 5, p. 229.
1858. Larva, pupa, (col'd figs.) *Duncan.* Natural. Library, vol. 22, p. 176.
1862. Larva, (brief.) *Morris,* (quotes Duncan.) Synop. Lep. N. Amer., p. 338.
1863. Larva, (brief.) *Saunders.* Canad. Journ., new series, vol. 8, p. 354.
1864. Larva. *Jaeger.* Life N. Amer. Ins., p. 167.
1873. Larva. *Stretch.* Zygæn. Bombyc. N. Amer., p. 127.
FOOD PLANTS. *Chenopodiaceæ, etc.*

Arctia saundersii. Grote.
1863. Larva. *Saunders,* (as A. parthenice.) Proc. Entom. Soc. Philad., vol. 2, p. 28.
1863. Larva. *Saunders,* (as A. parthenice.) Canad. Journ., new series, vol. 8, p. 353.
1864. Larva. *Grote,* (quotes Saunders.) Proc. Entom. Soc. Philad., vol. 3, p. 75.
1873. Larva, pupa. *Saunders.* Rept. Entom. Soc. Ontario, p. 23.
FOOD PLANTS. *Chenopodiaceæ, etc.*

Arctia achaia. G. and R.
1873. Larva, pupa. *Stretch.* Zygæn. Bombyc. N. Amer., p. 125.
FOOD PLANTS. *Trifolium, Erodium, etc.*

Arctia figurata. Drury.
1878. Larva. *E. L. Graef.* Bull. Brooklyn Entom. Soc., vol. 1, p. 3.

Arctia quenselii. Geyer.
1873. Larva, (fig.) *Packard.* Hayden's Surv. Territ., p. 558.
1882. Larva. *W. F. Kirby.* Europ. Butt. and Moths, p. 105.
FOOD PLANTS. *Lonicera, Taraxacum.*

Arctia phyllira. Drury.
1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 127, pl. 64.

Arctia nais. Drury.
1877. Larva. *French,* (as A. phalerata.) Trans. Dept. Agr. Ill., vol. 15, p. 182.
1880. Larva. *J. Marten,* (as A. phalerata.) Trans. Dept. Agr. Ill., vol. 18, Append., p. 115.
1880. Larva. *Coquillett,* (as A. phalerata.) Trans. Dept. Agr. Ill., vol. 18, Append., p. 171.
1885. Egg, larva. *Fernald.* Kingsley's Stand. N. Hist., vol. 2, p. 460.
FOOD PLANTS. *Gramineæ, etc.*

Arctia celia. Saunders.
1870. Larva. *Saunders.* Canad. Entom., vol. 2, p. 74.

Arctia virguncula. Kirby.
1881. Larva. *Coquillett.* Papilio, vol. 1, p. 7.
FOOD PLANT. *Polygonum.*

Arctia decorata. Saunders.
1881. Larva. *French.* Papilio, vol. 1, p. 81.

Arctia placentia. Abb.-Sm.
1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 129, pl. 65.

Arctia arge. Drury.

1796. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 125, pl. 63.
1837. Larva. *Westwood,* (quotes Abb.–Sm.) in Drury. Illus. Exot. Entom., vol. 1, p. 34.
1841. Larva. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 244.
1852. Larva. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 265.
1854. Larva, pupa, (figs.) *Emmons.* Nat. Hist. N. York, vol. 5, pl. 41.
1858. Larva, (col'd fig.) *Duncan.* Natural. Library, vol. 22, p. 175.
1862. Larva. *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 346.
1862. Larva. *Morris,* (quotes Duncan.) Synop. Lep. N. Amer., p. 340.
1863. Larva. *Saunders.* Canad. Jour., new series, vol. 8, p. 355, (as A. dione.)
1864. Larva. *Jaeger.* Life N. Amer. Ins., p. 168.
1869. Larva. *Harris.* Entom. Corres., p. 286.
1872. Larva. *Lintner.* 26th Rept. N. Y. State Cab. N. Hist., p. 143.
1873. Larva. *Stretch,* (quotes Harris.) Zygæn. Bombyc. N. Amer., p. 225.
1874. Larva. *Peabody.* Canad. Entom., vol. 6, p. 98.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 182.
1877. Egg, larva. *W. V. Andrews.* Psyche, vol. 2, p. 79.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 115.
1880. Larva. *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 170.

FOOD PLANT. *Œnothera biennis.*

Arctia brucei. Hy. Edwards.

1888. Larva. *D. Bruce.* Entom. Amer., vol. 3, p. 219.

FOOD PLANTS. *Polygonum, Plantago.*

Arctia remissa. Hy. Edwards.

1888. Egg, young larva. *Hy. Edwards.* Entom. Amer., vol. 3, p. 184.

NOTE. The food plants of the species of Arctia are not always given, as the caterpillars are almost omnivorous, feeding upon any kind of herbaceous plants.

Kodiosoma nigra. Stretch.

1873. Larva, (brief.) *Stretch.* Zygæn. Bombyc. N. Amer., p. 68.

Seirarctia echo. Abb.–Sm.

1797. Larva, (col'd figs.) *Abbot—Smith.* Lep. Ins. Georgia, p. 135, pl. 68.

Seirarctia clio. Packard.

1882. Larva, cocoon. *Behr.* Papilio, vol. 2, p. 187.

FOOD PLANT. *Apocynum.*

Pyrrharctia isabella. Abb.–Sm.

1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, pl. 66.
1840. Larva. *P. H. Gosse.* Canad. Naturalist, pp. 78, 308.
1841. Larva. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 253.
1852. Larva. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 273.
1854. Larva. *Emmons.* Nat. Hist. N. York, vol. 5, p. 229.
1862. Larva, cocoon, (fig.) *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 355.
1863. Larva. *Saunders.* Canad. Jour., new series, vol. 8, p. 364.
1867. Larva. *S. Tenney.* Manual N. Hist., p. 397.
1872. Larva, pupa, (fig.) *Riley.* 4th Missouri Rept., p. 143.
1873. Larva, cocoon, (figs.) *Saunders.* Canad. Entom., vol. 5, p. 76.
1873. Larva, cocoon, (figs.) *Saunders.* Rept. Entom. Soc. Ontario, p. 22.
1874. Larva, cocoon. *Hy. Edwards.* Proc. Cal. Acad. Sc., September.
1874. Larva, (fig.) *J. G. Wood.* Insects Abroad, p. 664.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 182.
1877. Larva, cocoon, pupa, (fig.) *B. Gott.* Rept. Entom. Soc. Ontario, p. 46.
1878. Larva. *B. P. Mann,* (quotes Harris.) Psyche, vol. 2, p. 270.
1880. Larva, cocoon, pupa, (figs.) *Riley.* Amer. Entom., 2d series, vol. 1, p. 133.
1880. Larva, cocoon, pupa, (figs.) *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 115.

1880. Larva, cocoon, pupa, (figs.) *Coquillett.* Loc. cit., 169.
FOOD PLANTS. Various low herbs.

Phragmatobia rubricosa. Harris.
1840. Larva, (brief.) *P. H. Gosse.* Canad. Naturalist, p. 195, (as P. fuliginosa.)
1883. Larva, cocoon, pupa. *Edwards—Elliot.* Papilio, vol. 3, p. 127.
1887. Young larva. *Hy. Edwards.* Entom. Amer., vol. 3, p. 68.
FOOD PLANTS. *Solidago, Eupatorium, Symplocarpus.*

Antarctia vagans. Boisd.
1874. Larva, pupa. *Hy. Edwards.* Proc. Cal. Acad. Sc., February.
FOOD PLANT. *Pteris.*

Antarctia punctata. Packard.
1873. Larva, cocoon. *Stretch.* Zygæn. Bombyc. N. Amer., p. 194.
FOOD PLANT. *Lupinus.*

Leucarctia acræa. Drury.
1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, pl. 67.
1823. Larva, pupa, (figs.) *Harris.* Massachusett's Agr. Reposit., p. 322.
1841. Larva, pupa, (figs.) *Harris.* Ins. Inj. Vegetat., 1st edit., p. 249.
1852. Larva, pupa. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 269.
1854. Larva. *Emmons.* Nat. Hist. N. York, vol. 5, p. 226.
1858. Larva, pupa, (fig.) *Duncan.* Natural. Library, vol. 22, p. 172, pl. 20.
1862. Larva. *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 351.
1862. Larva. *Morris.* Synop. Lep. N. Amer., p. 342.
1863. Larva. *Saunders.* Canad. Jour., new series, vol. 8, p. 363.
1867. Larva, pupa, (figs.) *S. Tenney.* Manual N. Hist., p. 398, pl. 294.
1874. Young larva. *Hy. Edwards.* Proc. Cal. Acad. Sc., September.
1873. Larva, (col'd figs.) *Stretch.* Zygæn. Bombyc., p. 101, pl. 10.
1877. Larva. *C. Thomas.* Trans. Dept. Agr. Ill., vol. 15, p. 79.
1877. Larva. *French.* Loc. cit., p. 183.
1879. Larva, pupa, (figs.) *Mrs. Ballard.* Insect Lives, p. 57.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 115.
1880. Larva. *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 170.
FOOD PLANTS. Various low herbs.

Spilosoma virginica. Fabr.
1841. Larva, pupa. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 248.
1852. Larva. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 268.
1856. Larva. *Fitch.* 3d Rept. Ins. N. York., p. 400.
1862. Larva, (fig. *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 349.
1862. Larva. *Morris.* Synop. Lep. N. Amer., p. 344.
1863. Larva. *Saunders.* Canad. Jour., new series, vol. 8, p. 362.
1864. Larva. *Jaeger.* Life N. Amer. Ins., p. 168.
1869. Larva, cocoon, pupa. *Harris.* Entom. Corres., p. 287.
1871. Larva, pupa, (figs.) *Riley.* 3d Missouri Rept., p. 68.
1871. Larva, pupa, (figs.) *Saunders.* Rept. Entom. Soc. Ontario, p. 358.
1872. Larva. *Lintner.* 26th Rept. N. York State Cab. N. Hist., p. 143.
1877. Larva. *C. Thomas.* Trans. Dept. Agr. Ill., vol. 15, p. 80.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 183.
1878. Larva, pupa, (figs.) *G. H. Perkins.* 5th Rept. Vermont Board Agr., p. 273.
1879. Larva, cocoon, pupa, (figs.) *Mrs Ballard.* Insect Lives, p. 54.
1880. Larva, pupa. *Saunders.* Canad. Entom., vol. 12, p. 56.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 116.
1880. Larva. *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 169.
1880. Life history, (figs.) *Saunders.* Rept. Entom. Soc. Ontario, p. 21.
1881. Larva, pupa, (figs.) *Packard,* (after Riley.) Ins. Inj. Forest Trees, p. 88.
1883. Life history, (figs.) *Saunders.* Ins. Inj. Fruits, p. 273.
1887. Egg, larva. *D. Bruce,* (melanic var.) Entom. Amer., vol. 3, p. 140.
FOOD PLANTS. Various.

Spilosoma congrua. Walker.

1886. Larva. *G. D. Hulst.* Entom. Amer., vol. 2, p. 15.

Spilosoma vestalis. Packard.

1875. Egg, larval stages. *Hy. Edwards.* Proc. Cal. Acad. Sc., April.

FOOD PLANT. *Lupinus.*

Spilosoma latipennis. Stretch.

1885. Young larva. *G. D. Hulst.* Bull. Brooklyn Entom. Soc., vol. 7, p. 120.

Hyphantria cunea. Drury. (includ. vars.)

1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 139, pl. 70.

1828. Larva. *Harris.* N. Engl'd Farmer, vol. 7, p. 33.

1841. Larva, pupa. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 255.

1852. Larva. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 274.

1856. Larva. *Fitch.* 3d Rept. Ins. N. York, p. 382.

1862. Larva, cocoon, pupa, (figs.) *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 358.

1862. Larva. *Morris,* (quotes Harris.) Synop. Lep. N. Amer., p. 344.

1863. Larva. *Saunders.* Canad. Jour., new series, vol. 8, p. 365.

1869. Larva. *Harris.* Entom. Corres., p. 360.

1870. Larva. *Saunders.* Canad. Entom., vol. 3, p. 36.

1871. Larva, pupa, (figs.) *Riley.* 3d Missouri Rept., p. 130.

1871. Larva, pupa, (figs.) *Bethune.* Rept. Entom. Soc. Ontario, p. 355.

1871. Larva, nest. *Le Baron.* 2d Illinois Rept., p. 18.

1873. Larva. *Saunders.* Canad. Entom., vol. 5, p. 141.

1873. Larva. *Stretch,* (quotes Saunders—Riley.) Zygæn. Bombyc. N. Amer., p. 206.

1873. Larva, pupa, (figs.) *Saunders.* Rept. Entom. Soc. Ontario, p. 13.

1875. Larva, pupa, (figs.) *A. J. Cook.* 12th Rept. Michigan Board Agr., p. 152.

1876. Larva. *G. H. Perkins.* 2d Rept. Vermont Board Agr., p. 589.

1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 185.

1877. Larva, pupa, (figs.) *Packard.* Inj. Ins. West, Hayden's Rept., p. 794.

1879. Larva, pupa, (figs.) *H. Cutting.* Rept. N. Hampshire Board Agr., p. 22.

1880. Larva, pupa, (figs.) *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 116.

1880. Larva, pupa, (figs.) *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 154.

1881. Larva, pupa, (figs.) *Packard,* (quotes Riley.) Ins. Inj. Forest Trees, p. 67.

1883. Larva, (brief.) *N. Coleman.* Papilio, vol. 3, p. 26.

1883. Larva, cocoon, pupa, (figs.) *Saunders.* Ins. Inj. Fruits, p. 71.

1887. Life history, (figs.) *Riley.* Bull. 10, Div. Entom., U. S. Dept. Agr., pp. 36–58.

1887. Life history, (figs.) *Riley.* Rept. U. S. Dept. Agr., 1886, pp. 518–539, pl. 10, 11.

1888. Larva, pupa, (fig.) *Bethune.* 18th Rept. Entom. Soc. Ontario, p. 58.

FOOD PLANTS. Various trees and shrubs.

Euchætes egle. Drury.

1841. Larva, pupa. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 256.

1852. Larva, cocoon, pupa. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 276.

1862. Larva, cocoon, pupa, (figs.) *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 359.

1862. Larva, (brief.) *Morris.* Synop. Lep. N. Amer., p. 343.

1863. Larva, pupa, (brief.) *Saunders.* Canad. Jour., new series, vol. 8, p. 366.

1869. Larva, (figs.) *Harris.* Entom. Corres., p. 288.

1870. Larva. *Lintner.* 21th Rept. N. York State Cab. N. Hist., p. 136.

Larva. *Stretch,* (quotes Harris.) Zygæn. Bombyc. N. Amer., p. 186.

arva. *W. V. Andrews.* Psyche, vol. 2, p. 271.

ife history, (brief.) *H. S. Jewett.* Canad. Entom., vol. 12, p. 230.

1883. Larva. *Hy. Edwards.* Papilio, vol. 3, p. 147.
1884. Egg, larval stages. *French.* Canad. Entom., vol. 16, p. 221.
FOOD PLANTS. Various species of *Asclepias.*

Euchætes eglenensis. Clemens.
1883. Larva. *Hy Edwards.* Papilio, vol. 3, p. 147.
FOOD PLANT. *Asclepias tuberosum.*

Euchætes collaris. Fitch.
1877. Larva. *G. H. Van Waggen.* Canad. Entom., vol. 9, p. 170.
1878. Larva, pupa. *W. H. Patten.* Psyche, vol. 2, p. 251.
1880. Larva. *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 169.
1880. Life history. *H. S. Jewett.* Canad. Entom., vol. 12, p. 228.
1883. Larval stages. *Hy. Edwards.* Papilio, vol. 3, p. 146.
FOOD PLANTS. *Apocynum, Asclepias.*

Arachnis aulea. Boisd.
1883. Larva, pupa. *W. Schaus, jr.* Papilio, vol. 3, p. 188.
FOOD PLANTS. Various low herbs.

Arachnis picta. Packard.
1873. Larva, pupa. *Stretch.* Zygæn. Bombyc. N. Amer., p. 84, pl. 10.
FOOD PLANT. *Lupinus.*

Ecpantheria scribonia. Stoll.
1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 137, pl. 69.
1841. Larva. *Harris,* (quotes Abb.–Sm.) Ins. Inj. Vegetat., 1st edit., p. 247.
1858. Larva. *Duncan.* Natural. Library, vol. 22, p. 169.
1862. Larva. *Morris,* (quotes Duncan.) Synop. Lep. N. Amer., p. 347.
1863. Larva. *Saunders.* Proc. Entom. Soc. Philad., vol. 2, p. 28.
1863. Larva. *Saunders.* Canad. Jour., new series, vol. 8, p. 370.
1872. Larva, pupa, (fig.) *Riley.* 4th Missouri Rept., p. 141.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 184.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 116.
1882. Larva, (fig.) *Saunders.* Canad. Entom., vol. 14, p. 113.
1882. Larva, (fig.) *Saunders.* Rept. Entom. Soc. Ontario, p. 15.
FOOD PLANTS. *Helianthus, Plantago, Salix.*

Ecpantheria reducta. Gr.
1887. Larva. *D. Bruce.* Entom. Amer., vol. 3, p. 14.
FOOD PLANTS. *Taraxacum, Stellaria, etc.*

Halisidota tesselata. Abb –Sm. (incl. vars.)
1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 149, pl. 75.
1840. Larva, cocoon. *P. H. Gosse.* Canad. Naturalist, p. 293.
1841. Larva, pupa. *Harris,* (quotes Abb.–Sm.) Ins. Inj. Vegetat., 1st edit., p. 259.
1852. Larva. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 280.
1862. Larva. *Morris,* (quotes Harris.) Synop. Lep. N. Amer., p. 349.
1862. Larva. *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 364.
1863. Larva. *Saunders.* Canad. Jour., new series, vol. 8, p. 367.
1863. Larva. *B. D. Walsh.* Proc. Boston Soc. N. Hist., vol. 9, p. 289.
1864. Larva. *B. D. Walsh.* Proc. Entom. Soc. Philad., vol. 3, p. 413.
1864. Larva. *B. D. Walsh.* Proc. Entom. Soc. Philad., vol. 3, p. 430.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 116.
1880. Larva. *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 168.
1885. Larva. *Fernald.* Kingsley's Stand. N. Hist., vol. 2, p. 460.
FOOD PLANT. *Acer.*

Halisidota caryæ. Harris.
1841. Larva, pupa. *Harris.* Ins. inj. Vegetat., 1st edit., p. 258.
1852. Larva, pupa. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 279.
1854. Larva, pupa, (figs.) *Fitch.* 1st Rept. Ins. N. York, p. 160.
1856. Larva. *Fitch.* 3d Rept. Ins. N. York, p. 458.

1862. Larva, cocoon, (col'd figs.) *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 361, pl. 6.
1862. Larva. *Morris,* (quotes Harris.) Synop. Lep. N. Amer., p. 348.
1863. Larva. *Saunders.* Canad. Jour., new series, vol. 8, p. 368.
1869. Larva. *Harris.* Entom. Corres., p. 289.
1872. Cocoon. *Lintner.* 26th Rept. N. York State Cab. N. Hist., p. 148.
1880. Larva. *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 168.
1881. Larva. *Packard,* (quotes Fitch.) Ins. Inj. Forest Trees, p. 76.
FOOD PLANTS. *Carya, Juglans, etc.*

Halisidota maculata. Harris, (incl. vars.)
1841. Larva, pupa. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 259.
1852. Larva, (brief.) *Harris.* Ins. Inj. Vegetat., 2d edit., p. 279.
1862. Larva, (brief.) *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 363.
1863. Larva. *Saunders.* Canad. Jour., new series, vol. 8, p. 369.
1869. Larva, (fig.) *Harris.* Entom. Corres., p. 290, pl. 9.
1869. Larva. *Packard.* Guide to Study of Ins., p. 287.
1871. Larva. *Saunders.* Canad. Entom., vol. 3, p. 186.
1873. Larva, cocoon, (col'd figs.) *Stretch.* Zygæn. Bombyc. N. Amer., p. 103, pl. 10.
1876. Larva, cocoon. *Hy. Edwards.* Proc. Cal. Acad. Sc., November.
1881. Larva. *Packard,* (quotes Saunders.) Ins. Inj. Forest Trees, p. 46.
FOOD PLANTS. *Salix, Populus, etc.*

Halisidota argentata. Packard.
1874. Larva, cocoon, pupa. *Hy. Edwards.* Proc. Cal. Acad. Sc., September.
FOOD PLANTS. *Pinus, Abies.*

Halisidota sobrina. Stretch.
1874. Larva, pupa. *Hy. Edwards.* Proc. Cal. Acad. Sc., September.
1887. Larva, (brief.) *J. Fletcher.* Rept. Entom. Dept. Agr. Canad., p. 34.
FOOD PLANT. *Pinus.*

Halisidota edwardsii. Packard.
1873. Larva, (col'd fig.) *Stretch.* Zygæn. Bombyc. N. Amer., p. 88, pl. 10.
1875. Egg, young larva. *Hy. Edwards.* Proc. Cal. Acad. Sc., April.
FOOD PLANT. *Quercus.*

Halisidota cinctipes. Grote.
1886. Larva. *Gundlach.* Entom. Cubana, p. 269.
FOOD PLANT. *Hibiscus.*

Sub-fam. **Pericopidæ.**

Gnophæla hopfferi. G. and R.
1882. Larva, (brief.) *Stretch,* (quotes Lord Walsingham in lit.) Papilio, vol. 2, p. 82.
FOOD PLANT. *Myosotis.*

Gnophæla verniculata. Gr. Rob.
1888. Larva. *D. Bruce.* Entom. Americana, vol. 4, p. 24.
1889. Larva. *T. D. Cockerell.* Entom. Amer., vol. 5, p. 57.
FOOD PLANT. *Mertensia virginica.*

Melanchroia geometroides. Walker.
1886. Larva, pupa. *Gundlach.* Entom. Cubana, p. 410.
FOOD PLANT. *Cicca racemosa.*

Sub-fam. **Liparidæ.**

Orgyia nova. Fitch.
1829. Egg, (fig.) *W. T. Bree.* Mag. Nat. Hist., vol. 2, p. 460, (as O. antiqua.)
1841. Larva, pupa. *Harris,* (as O. antiqua.) Ins. Inj. Vegetat., 1st edit., p. 262.
1852. Larva, cocoon. *Harris,* (as O. antiqua.) Ins. Inj. Vegetat., 2d edit., p. 284.
1862. Life history. *Fitch.* 8th Rept. Ins. N. York, p. 675.

1862. Larva, cocoon. *Harris*, (as O. antiqua.)Ins. Inj. Vegetat., Flint's edit., p. 369.
1862. Larva. *Morris*, (quotes Harris.) Synop. Lep. N. Amer., p. 250.
1873. Egg, larva. *Hy. Edwards*, (as O. badia.) Proc. Cal. Acad. Sc., November.
1880. Egg. *W. S. B.* Amer. Entom., vol. 1, 2d series, p. 77.
1880. Cocoon. *W. S. B.* Loc. cit., p. 132.
1883. Larva, (brief.) *Hy. Edwards.* Papilio, vol. 3, p. 189.
1883. Egg, larva. *Stretch.* Loc. cit., p. 38.
1887. Egg, larval stages. *Hy. Edwards.* Entom. Amer., vol. 3, p. 146.
FOOD PLANTS. *Rosaceæ, etc.*

Orgyia vetusta. Boisd.
1881. Larva. *Hy. Edwards.* Papilio, vol. 1, p. 60.
FOOD PLANT. *Lupinus.*

Orgyia gulosa. Hy. Edwards.
1881. Larva. *Hy. Edwards.* Papilio, vol. 1, p. 61.
FOOD PLANT. *Quercus.*

Orgyia leucostigma. Abb.-Sm.
1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 157, pl. 79.
1833. Egg. *B. H. Ives.* Hovey's Gardener's Mag., vol. 1, p. 52.
1841. Larva, pupa. *Harris*, (quotes Abb.-Sm.) Ins. Inj. Vegetat., 1st edit., p. 262.
1852. Egg, larva, cocoon. *Harris*, (quotes Ives in part.) Ins. Inj. Vegetat., 2d edit., p. 284.
1854. Larva, (col'd fig.) *Emmons.* Nat. Hist. N. York, vol. 5, p. 230, pl. 37.
1856. Larva, cocoon, pupa. *Fitch.* 2d Rept. Ins. N. York, p. 210.
1862. Life history, (col'd figs.) *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 366, pl. 7.
1862. Larva. *Morris*, (quotes Harris.) Synop. Lep. N. Amer., p. 249.
1864. Larva, (fig.) *Jaeger.* Life N. Amer. Ins., p. 169.
1869. Life history, (figs.) *Riley.* 1st Missouri Rept., p. 144.
1871. Life history, (figs.) *Le Baron*, (after Riley.) 2d Illinois Rept., p. 13.
1871. Egg, larva. *Saunders.* Canad. Entom., vol. 3, p. 15.
1871. Larva, cocoon, pupa, (figs.) *Bethune.* Rept. Entom. Soc. Ontario, p. 354.
1874. Egg, larva, pupa, (figs.) *Saunders.* Rept. Entom. Soc. Ontario, p. 19.
1877. Larva, (fig.) *French.* Trans. Dept. Agr. Ill., vol. 15, p. 185.
1880. Larva. *French*, (as O. leucographa.) 6th Rept. S. Ill. Norm. Univ., p. 44.
1880. Larva, (fig.) *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 117.
1880. Larva, (fig.) *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 166.
1881. Larva, cocoon, pupa, (figs.) *Packard*, (after Riley.) Ins. Inj. Forest Trees, p. 239.
1883. Life history, (figs.) *Saunders.* Ins. Inj. Fruits, p. 58.
1885. Life history, (figs.) *Lintner.* 2d Rept. State Entom. N. York, p. 70.
1887. Life history, (figs.) *Riley.* Bull. 10, Div. Entom. U. S. Dept. Agr., pp. 23–28.
1888. Larva, (fig.) *Lintner.* 4th Rept. N. Y. State Entom., p. 48.
FOOD PLANTS. *Acer, Pyrus, Quercus, etc.*

Orgyia definita. Packard.
1888. Larva, notes on. *Lintner.* 4th Rept. N. Y. State Entom., p. 50.

Parorgyia leucophæa. Abb.-Sm.
1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 155, pl. 78.
1841. Larva. *Harris.* (quotes Abb.-Sm.) Ins. Inj. Vegetat., 1st edit., p. 264.
FOOD PLANT. *Quercus.*

Parorgyia clintonii. S. and R.
1880. Larva. *Coquillett.* Canad. Entom., vol. 12, p. 45.
1880. Larva. *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 165.
FOOD PLANT. *Quercus.*

Parorgyia achatina. Abb.–Sm.

1797. Larva, (col'd fig.) *Abbott—Smith.* Lep. Ins. Georgia, p. 153, pl. 77.

FOOD PLANT. *Quercus.*

Parorgyia parellela. G. and R.

1872. Larva. *Lintner.* 26th Rept. N. York State Cab. N. Hist., p. 129.

1880. Larva. *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 166.

1881. Larva. *Packard,* (quotes Lintner.) Ins. Inj. Forest Trees, p. 204.

1883. Larva. *Saunders.* Ins. Inj. Fruits, p. 179.

1887. Life history. *O. Seiffert.* Entom. Amer., vol. 3, p. 93.

FOOD PLANTS. *Pyrus, Prunus, Æsculus, etc.*

Lagoa crispata. Packard.

1864. Larva, cocoon, pupa. *Packard.* Proc. Entom. Soc. Philad., vol. 3, p. 335.

1866. Larva, (brief.) *B. D. Walsh.* Practical Entom., vol. 1, p. 126.

1869. Larva, (fig.) *Packard.* Guide to Study of Ins., p. 288.

1870. Life history. *Lintner.* 4th Rept. N. York State Cab. N. Hist., p. 138.

1881. Larva, cocoon, (brief.) *Packard.* Ins. Inj. Forest Trees, p. 176.

1885. Larva, (fig.) *Packard.* Amer. Naturalist, vol. 19, p. 714.

FOOD PLANTS. *Ulmus, Myrica, Pyrus, etc.*

Lagoa opercularis. Abb.–Sm.

1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 105, pl. 53.

1841. Larva. *Harris,* (quotes Abb.–Sm.) Ins. Inj. Vegetat., 1st edit., p. 264.

1856. Larva. *Fitch,* (? crispata.) 3d Rept. Ins. N. York, p. 363.

1876. Larva, (brief.) *Mary E. Murtfeldt.* Canad. Entom., vol. 8, p. 201.

1885. Larva, cocoon, (figs.) *Hubbard.* Ins. Affect. Orange, p. 140.

1888. Life history, (brief,) (figs.) *Lintner,* (quotes Hubbard.) 4th Rept. N. Y. State Entom., p. 51.

FOOD PLANTS. *Citrus, Pyrus, etc.*

Lagoa pyxidifera. Abb.–Sm.

1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 107, pl. 54.

FOOD PLANTS. *Vaccinium, Quercus, etc.*

Sub-fam. **Cochliopodæ.**

Euclea cippus. Cram. (Querceti. H. Sch.)

1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 145, pl. 73.

1841. Larva. *Harris,* (quotes Abb.–Sm.) Ins. Inj. Vegetat., 1st edit., p. 303.

1852. Larva. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 323.

1858. Larva, (col'd fig.) *Duncan.* Natural. Library, vol. 22, p. 178, pl. 21.

1862. Larva. *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 421.

1862. Larva. *Morris,* (quotes Duncan.) Synop. Lep. N. Amer., p. 126.

1864. Larva. *Packard.* Proc. Entom. Soc. Philad., vol. 3, p. 337.

1869. Larva, (fig.) *Harris.* Entom. Corres., p. 176, pl. 2.

1878. Larva. *W. V. Andrews.* Psyche, vol. 2, p. 272.

1881. Larva. *French.* Papilio, vol. 1, p. 145.

FOOD PLANTS. *Prunus, Pyrus, Salix, etc.*

Euclæa pænulata. Clem.

1881. Larva. *French.* Papilio, vol. 1, p. 144.

FOOD PLANT. *Salix.*

Parasa chloris. H. Sch.

1864. Larva. *T. Reakirt.* Proc. Entom. Soc. Philad., vol. 3, p. 251.

1875. Larva. *A. G. Wetherby.* Cincinnati Jour. Sc., vol. 2, p. 368.

1878. Larva. *W. V. Andrews.* Psyche, vol. 2, p. 271.

1883. Larva. *Edwards—Elliot.* Papilio, vol. 3, p. 128.

1885. Larva. *French.* Canad. Entom., vol. 17, p. 160.

FOOD PLANTS. *Ulmus, Myrica, etc.*

arasa fraterna. Gr.

1887. Larva. *Hy. Edwards.* Entom. Amer., vol. 3, p. 169.

FOOD PLANTS. *Cerasus, etc.*

Nochelia tardigrada. Clem.

1860. Larva. *Clemens.* Proc. Acad. N. Sc. Philad., p. 159.
1862. Larva. *Morris,* (quotes Clemens.) Synop. Lep. N. Amer., p. 131.
FOOD PLANT. *Apricot,* (Clemens.)

Empretia stimulea. Clem.

1860. Larva. *Clemens.* Proc. Acad. N. Sc. Philad., p. 159.
1862. Larva. *Morris,* (quotes Clemens.) Synop. Lep. N. Amer., p. 130.
1869. Larva, (fig.) *Harris,* (as Lim. ephippiatus.) Entom. Corres., p. 175, pl. 2.
1869. Larva. *Packard.* Guide to Study of Ins., p. 289.
1872. Cocoon. *Lintner.* 26th Rept. N. York State Cab. N. Hist., p. 149.
1876. Larva. *A. G. Wetherby.* Cincin. Jour. Sc., vol. 2, p. 369.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 187.
1880. Larva. *J. Marten,* (quotes Clemens.) Trans. Dept. Agr. Ill., vol. 18, Append., p. 117.
1883. Larva, cocoon, (figs.) *Saunders.* Ins. Inj. Fruits, p. 113.
1885. Larva, cocoon, (col'd figs.) *H. G. Hubbard.* Ins. Affect. Orange, p. 142.
FOOD PLANTS. *Ulmus, Myrica, Prunus, Citrus, etc.*

Phobetron pithecium. Abb.–Sm.

1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 147, pl. 74.
1841. Larva. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 304.
1852. Larva, cocoon. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 324.
1856. Larva. *Fitch.* 3d Rept. Ins. N. York, p. 381.
1858. Larva, (col'd fig.) *Duncan.* Natural. Library, vol. 22, p. 185, pl. 21.
1862. Larva, cocoon, (fig.) *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 421.
1862. Larva. *Morris.* Synop. Lep. N. Amer., p. 127.
1872. Cocoon. *Lintner.* 26th Rept. N. York State Cab. N. Hist., p. 149.
1881. Larva. *Packard.* Ins. Inj. Forest Trees, p. 47.
1883. Larva, cocoon, (fig.) *Saunders.* Ins. Inj. Fruits, p. 112.
1885. Larva, cocoon, (col'd figs.) *H. G. Hubbard.* Ins. Affect. Orange p. 143
FOOD PLANTS. *Prunus, Quercus, etc.*

Phobetron hyalinum. Walsh.

1863. Larva. *B. D. Walsh.* Proc. Boston Soc. N. Hist., vol. 9, p. 297.
FOOD PLANT. *Prunus.*

Limacodes scapha. Harris.

1852. Larva, (brief.) *Harris.* Ins. Inj. Vegetat., 2d edit., p. 323.
1862. Larva. *Harris,* Ins. Inj. Vegetat., Flint's edit., p. 420.
1864. Larva, (brief.) *Packard,* (quotes Shurtleff in lit.) Proc. Entom. Soc. Philad., vol. 3, p. 341.
1869. Larva, (fig.) *Harris.* Entom. Corres., pp. 176, 300, pl. 3.
1873. Larva. *Stretch,* (quotes Harris.) Zygæn. Bombyc. N. Amer., p. 201.
1881. Larva. *Packard.* Ins. Inj. Forest Trees, p. 77.
1883. Larva. *Edwards—Elliot.* Papilio, vol. 3, p. 128.
1885. Larva, (col'd fig.) *H. G. Hubbard.* Ins. Affect. Orange, p. 144.
FOOD PLANTS. *Prunus, Myrica, Ulmus, Pyrus, Citrus, etc.*

Limacodes biguttata. Packard.

1873. Cocoon. *Stretch.* Zygæn. Bombyc. N. Amer., p. 202.

Limacodes fasciola. H. Sch.

1860. Larva. *Clemens.* Proc. Acad. N. Sc. Philad., p. 157.
1862. Larva. *Morris,* (quotes Clemens.) Synop. Lep. N. Amer., p. 128.
1872. Larva, (brief.) *Lintner.* 26th Rept. N. York State Cab. N. Hist., p. 149.
1881. Larva. *Packard,* (quotes Clemens.) Ins. Inj. Forest Trees, p. 112.
1883. Larva, cocoon, (brief.) *Saunders.* Ins. Inj. Fruits, p. 179.
FOOD PLANT. *Acer.*

NOTE.—These descriptions include L. laticlavia, Clem., which I believe to be a distinct species.—H. E.

Sisyrosea inornata. G. and R.

1887. Larva. *G. D. Hulst.* Entom. Amer., vol. 3, p. 66.
1889. Larva. *H. G. Dyar.* Canad. Entom., vol. 21, p. 77.
FOOD PLANT. *Myrica cerifera.*

Adoneta spinuloides. H. Sch.

1860. Larva. *Clemens.* Proc. Acad. Sc. Philad., p. 168.
1862. Larva. *Morris,* (quotes Clemens.) Synop. Lep. N. Amer., p. 129.
1882. Larva, *Mrs. Ballard.* Papilio, vol. 2, p. 83.
1883. Larva. *Edwards—Elliot.* Papilio, vol. 3, p. 129.
FOOD PLANT. *Prunus, etc.*

Packardia fusca. Packard.

1864. Cocoon, pupa. *Packard.* Proc. Entom. Soc. Philad., vol. 3, p. 343.

Kronæa minuta. Reakirt.

1864. Larva, pupa. *T. Reakirt.* Proc. Entom. Soc. Philad., vol. 3, p. 251.

Sub-fam. **Psychidæ.**

Psyche confederata. Grote and Rob.

1868. Larval case, (fig.) *Grote—Robinson.* Trans. Amer. Entom. Soc., vol. 2, p. 191, pl. 3.
1885. Larval case, (fig.) *H. G. Hubbard.* Ins. Affect. Orange, p. 148.
1887. Larva, pupa. *Hy. Edwards.* Entom. Amer., vol. 3, p. 168.

Psyche fragmentella. Hy. Edwards.

1876. Larval case. *Hy. Edwards.* Proc. Cal. Acad. Sc., November.

Psyche coniferella. Hy. Edwards.

1876. Larval case. *Hy. Edwards.* Proc. Cal. Acad. Sc., November.

Platœceticus gloveri. Packard.

1869. Larva, case, pupa, (figs.) *Packard.* Guide to Study of Ins., p. 291.
1883. Larva, case, pupa, (figs.) *Saunders,* (after Packard.) Ins. Inj. Fruits, p. 380.
1885. Case, pupa, (figs.) *H. G. Hubbard.* Ins. Affect. Orange, p. 149.
FOOD PLANT. *Citrus.*

Thyridopteryx ephemeræformis. Haworth.

1853. Larva, case. *Harris.* Downing's Horticult., vol. 8, p. 461, (as Oik. coniferarum.)
1855. Larva, case, pupa. *T. Glover.* Trans. N. York State Agr. Soc., p. 79.
1859. Larva, case. *P. H. Gosse.* Letters from Alabama, p. 283.
1864. Case. *Packard.* Proc. Entom. Soc. Philad., vol. 3, p. 351.
1866. Larva, case. *B. D. Walsh.* Practical Entom., vol. 2, pp. 22, 84.
1866. Larva, case. *S. S. Rathvon.* Loc. cit., p. 53.
1869. Life history, (figs.) *Riley.* 1st Missouri Rept., p. 147.
1869. Larva. *Harris,* (as Oik. coniferarum.) Entom. Corres., pp. 176, 300.
1869. Larva, case, (fig.) *Packard.* Guide to Study of Ins., p. 291.
1877. Larva, case. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 187.
1880. Egg, larva, case, pupa, (figs.) *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 118.
1881. Larva, case. *Packard.* Ins. Inj. Forest Trees, p. 248.
1881. Life history. *Helen S. King.* Psyche, vol. 3, p. 241.
1883. Young larva. *Hy. Edwards.* Papilio, vol. 3, p. 24.
1883. Life history, (figs.) *Saunders.* Ins. Inj. Fruits, p. 222.
1885. Larval case, pupa. *H. G. Hubbard.* Ins. Affect. Orange, p. 147.
1886. Life history. *W. MacFarland.* Jour. Trenton N. H. Soc., vol. 1, p. 1.
1887. Life history, (figs.) *Riley.* Bull. 10, Div. Entom. U. S. Dept. Agr., pp. 23–28.
888. Egg, larval case, larva, pupa, (figs.) *Grote.* 18th Rept. Entom. Soc. Ontario, p. 74.
FOOD PLANTS. *Pinus, Cupressus, Salix, Quercus, etc.*

Thyridoptery meadii. Hy. Edwards.
1881. Larval case. *Hy. Edwards.* Papilio, vol. 1, p. 116.

Oiketicus abbotii. Grote.
1880. Larva, case. *Grote.* N. Amer. Entom., p. 52.
1885. Life history, (figs.) *H. G. Hubbard.* Ins. Affect. Orange, p. 144, pl. 12.
FOOD PLANTS. *Citrus, etc.*

Oiketicus davidsonii. Hy. Edwards.
1876. Larval case, pupa, (figs.) *Hy. Edwards.* Proc. Cal. Acad. Sc., November.

Perophora melsheimeri. Harris.
1841. Larva, case, pupa. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 301.
1852. Larva, case, pupa. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 319.
1862. Larva, case, pupa, (figs.) *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 415, pl. 6.
1869. Larva, case, pupa. *Harris.* Entom. Corres., p. 151.
1869. Larva, case. *Packard.* Guide to Study of Ins., p. 292.
1880. Larva, case. *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 156.
FOOD PLANT. *Quercus.*

Sub-fam. **Notodontidæ.**

Ichthyura inclusa. Hübn.
1797. Larva, (col'd fig.) *Abbot—Smith,* (as Clos. anastomosis.) Lep. Ins. Georgia, p. 143, pl. 72.
1841. Larva. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 314.
1852. Larva. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 333.
1858. Larva. *Fitch.* 5th Rept. Nox. Ins. N. York, p. 845.
1862. Life history, (col'd figs.) *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 431.
1869. Larva, (fig.) *Harris.* Entom. Corres., p. 310, pl. 3.
1881. Larva, pupa. *Packard,* (quotes Harris.) Ins. Inj. Forest Trees, p. 122.
1883. Young larva. *Hy. Edwards.* Papilio, vol. 3, p. 24.
FOOD PLANT. *Populus.*

Ichthyura ornata. S. and R.
1885. Life history. *French.* Canad. Entom., vol. 17, p. 248.
FOOD PLANT. *Salix.*

Ichthyura palla. French.
1882. Larva. *French.* Canad. Entom., vol. 14, p. 34.
1885. Life history. *French.* Canad. Entom., vol. 17, p. 41.
FOOD PLANT. *Salix.*

Ichthyura albosigma. Fitch.
1855. Egg, larva, cocoon. *Fitch.* 2d Rept. Ins. N. York, p. 274.
1858. Larva. *Fitch.* 5th Rept. Ins. N. York, p. 844.
1881. Larva. *Packard.* Ins. Inj. Forest Trees, p. 122.
FOOD PLANT. *Populus.*

Apatelodes torrefacta. Abb.-Sm.
1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 151, pl. 76.
1864. Larva, (brief.) *Packard.* Proc. Entom. Soc. Philad., vol. 3, p. 353.
1869. Larva. *Harris.* Entom. Corres., p. 307.
FOOD PLANTS. *Rubus, etc.*

Apatelodes angelica. Grote.
1872. Larva. *Lintner.* 26th Rept. N. York State Cab. N. Hist., p. 130.
FOOD PLANTS. *Fraxinus, Syringa.*

Datana ministra. Drury.
1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 161, pl. 81.
1841. Larva. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 312.
1852. Larva. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 332.
1855. Larva, pupa, (figs.) *Fitch.* 2d Rept. Ins. N. York, p. 237.
1856. Larva. *Fitch.* 3d Rept. Ins. N. York, p. 337.

1862. Larva, (fig.) *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 429.
1866. Larva. *Grote—Robinson,* (quote Angus in lit.) Proc. Entom. Soc. Philad., vol. 6, p. 11.
1866. Larva. *B. D. Walsh.* Practical Entom., vol. 2, p. 7.
1869. Larva, (fig.) *Harris.* Entom. Corres., p. 308, pl. 2.
1873. Life history, (figs.) *Le Baron.* 4th Illinois Rept., p. 186.
1877. Larva, (fig.) *French.* Trans. Dept. Agr. Ill., vol. 15, p. 189.
1880. Egg, larva, (fig.) *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 119.
1880. Egg, larva, (fig.) *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 167.
1883. Larva, (fig.) *Saunders.* Ins. Inj. Fruits, p. 61.
1888. Life history. *W. Beutenmüller.* Canad. Entom., vol. 20, p. 16.
FOOD PLANTS. *Carya, Juglans.*

Datana angusii. G. and R.
1866. Larva. *Grote—Robinson,* (quote Angus in lit.) Proc. Entom. Soc. Philad., vol. 6, p. 10.
1888. Larva. *W. Beutenmüller.* Canad. Entom., vol. 20, p. 135.
FOOD PLANTS. *Juglans, Carya.*

Datana major. G. and R.
1878. Larva. *W. V. Andrews.* Psyche, vol. 2, p. 272.
1889. Larva. *H. G. Dyar.* Canad. Entom., vol. 21, p. 34.
FOOD PLANT. *Andromeda ligustrina.*

Datana integerrima. G. and R.
1866. Larva. *Grote—Robinson,* (quote Angus in lit.) Proc. Entom. Soc. Philad., vol. 6, p. 13.
1888. Larval stages. *W. Beutenmüller.* Canad. Entom., vol. 20, p. 134.
FOOD PLANTS. *Juglans, Carya, Quercus, etc.*

Datana floridana. Graef.
1881. Larva. *A. Koebele.* Bull. Brooklyn Entom. Soc., vol. 4, p. 21.

Datana drexelii. Hy. Edwards.
1884. Larva. *Hy. Edwards.* Papilio, vol. 4, p. 25.
1886. Life history. *W. Beutenmüller.* Canad. Entom , vol. 20, p. 57.
FOOD PLANTS. *Vaccinium corymbosum, Hamamelis.*

Datana contracta. Walker.
1866. Larva. *Grote—Robinson,* (quote Angus in lit.) Proc. Entom. Soc. Philad., vol. 6, p. 14.
1888. Larval stages. *W. Beutenmüller.* Canad. Entom., vol. 20, p. 134.
FOOD PLANTS. *Quercus, Castanea, Carya.*

Datana perspicua. G. and R.
1887. Egg, larval stages. *Hy. Edwards.* Entom. Amer., vol. 3, p. 170.
FOOD PLANT. *Rhus typhina.*

Nadata gibbosa. Abb.-Sm.
1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 163, pl. 82.
1869. Larva. *Harris.* Entom. Corres., p. 308.
1872. Larva, (fig.) *Lintner.* 26th Rept. N. York State Cab. N. Hist., p. 150.
1874. Larva, (fig.) *Packard,* (quotes Lintner.) Amer. Naturalist, vol. 8, p. 691.
FOOD PLANT. *Quercus.*

Hyparpax aurora. Abb.-Sm.
1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 173, pl. 87.
1888. Larval stages. *Hy. Edwards.* Entom. Amer., vol. 3, p. 169.
FOOD PLANT. *Quercus.*

Heliophisia trilineata. Packard.
1883. Larva. *Edwards—Elliot.* Papilio, vol. 3, p. 129.
FOOD PLANT. *Salix.*

Notodonta stragula. Grote.

1883. Larva. *Edwards—Elliot.* Papilio, vol. 3, p. 129.

FOOD PLANT. *Salix.*

Lophodonta angulosa. Abb.-Sm.

1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 165, pl. 83.

FOOD PLANT. *Quercus.*

Pheosia rimosa. Park.

1882. Larva, pupa. *C. F. Goodhue.* Canad. Entom., vol. 14, p. 73.

FOOD PLANTS. *Salix, Populus.*

Pheosia californica. Stretch.

1873. Larva, (col'd fig.) *Stretch.* Zygæn. Bombyc. N. Amer., p. 117, pl. 10.

Edema albifrons. Abb.-Sm.

1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 159, pl. 80.

1854. Larva, pupa, (figs.) *Emmons.* Nat. Hist. N. York, vol. 5, p. 242, pl. 37.

1869. Larva. *Harris.* Entom. Corres., p. 304.

1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 191.

1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 120.

FOOD PLANT. *Quercus.*

Seirodonta bilineata. Packard.

1869. Larva, (fig.) *Harris.* Entom. Corres., p. 201, pl. 1.

1869. Larva, (fig.) *Harris,* (as Gluph. ulmi.) Loc. cit., p. 302, pl. 11.

1886. Larva. *French.* Canad. Entom., vol. 18, p. 49.

FOOD PLANT. *Ulmus.*

Oedemasia concinna. Abb.-Sm.

1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 169, pl. 85.

1841. Larva. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 309.

1852. Egg, larva. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 328.

1856. Larva. *Fitch.* 3d Rept. Ins. N. York, p. 342.

1862. Egg, larva, (figs.) *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 426.

1869. Larva, (fig.) *Harris.* Entom. Corres., p. 303, pl. 1.

1877. Larva. *French,* (quotes Harris.) Trans. Dept. Agr. Ill., vol. 15, p. 190.

1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 120.

1881. Life history. *Saunders.* Canad. Entom., vol. 13, p. 138.

1882. Larva, pupa, (figs.) *Saunders.* 12th Rept. Entom. Soc. Ontario, p. 21.

1883. Larva. *Edwards—Elliot.* Papilio, vol. 3, p. 130.

1883. Larva, pupa, (figs.) *T. J. Edge.* Rept. Agr. Pennsylv., p. 70.

1883. Larva, pupa, (figs.) *Saunders.* Ins. Inj. Fruits, p. 63.

1888. Larva, (fig.) *J. Fletcher.* Rept. Entom. Dept. Agr. Canad., p. 28.

FOOD PLANT. *Salix, Prunus, etc.*

Oedemasai salicis. Hy. Edwards.

1876. Larva, cocoon, pupa. *Hy. Edwards.* Proc. Cal. Acad. Sc., October.

FOOD PLANT. *Salix.*

Dasylophia anguina. Abb.-Sm.

1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 167, pl. 84.

1869. Larva, (fig.) *Harris.* Entom. Corres., p. 304, pl. 1.

1889. Life history. *H. G. Dyar.* Entom. Amer., vol. 5, p. 55.

FOOD PLANT. *Robinia.*

Coelodasys unicornis. Abb.-Sm.

1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia., p. 171, pl. 83.

1841. Larva. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 307.

1852. Larva. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 326.

1856. Larva. *Fitch.* 3d Rept. Ins. N. York, p. 363.

1862. Larva. *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 424.

1869. Larva, (fig.) *Harris.* Entom. Corres., p. 302, pl. 11.

1872. Larva. *Lintner.* 26th Rept. State Cab. N. Hist., p. 131.

1874. Larva, (fig.) *Packard,* (quotes Lintner.) Amer. Naturalist, vol. 8, p. 691.

1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 191.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 120.
1880. Larva. *Coquillett,* (quotes Lintner.) Trans. Dept. Agr. Ill., vol. 18, Append., p. 147.
1880. Larva. *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 181.
1883. Larva, cocoon, (figs.) *Saunders.* Ins. Inj. Fruits, p. 80.
FOOD PLANTS. *Prunus, Pyrus, etc.*

Coelodasys mustelina. Pack.
1886. Larva. *French.* Canad. Entom., vol. 18, p. 92.
FOOD PLANT. *Rosa.*

Coelodasys biguttata. Pack.
1870. Larva, pupa, (figs.) *Packard.* Amer. Naturalist, vol. 4, p. 229.
FOOD PLANT. *Ipomea coccinea.*

Janassa lignicolor. Walker.
1889. Life history. *H. G. Dyar.* Entom. Amer., vol. 5, p. 91.

Heterocampa astarte. Doubl.
1869. Larva. *Harris,* (quotes Doubleday in lit., 1839.) Entom. Corres., p. 132.

Heterocampa unicolor. Pack.
1887. Larva. *Hy. Edwards.* Entom. Amer., vol. 3, p. 168.
FOOD PLANT. *Acer pseudo-plantanus.*

Heterocampa pulverea. G. and R.
1880. Larva. *French.* Canad. Entom., vol. 12, p. 83.
1880. Larva. *French.* 6th Ann. Rept. S. Ill. Normal Univ., p. 44.
1881. Larva. *Packard,* (quotes French.) Ins. Inj. Forest Trees, p. 46.
FOOD PLANT. *Quercus.*

Heterocampa marthesia. Cram.
1884. Larva. *Packard,* (as H. tessela.) Amer. Naturalist, vol. 18, p. 1045.
FOOD PLANT. *Quercus.*

Cerura occidentalis. Lintn.
1881. Larva. *French.* Canad. Entom., vol. 13, p. 144.
FOOD PLANT. *Cerasus.*

Cerura cinerea. Walk.
1883. Larva. *Edwards—Elliot.* Papilio, vol. 3, p. 130.
FOOD PLANT. *Salix.*

Cerura borealis. Boisd.
1797. Larva, (col'd figs.) *Abbot—Smith,* (as C. furcula.) Lep. Ins. Georgia, p. 141, pl. 71.
1841. Larva. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 305.
1872. Larva, (fig.) *Lintner.* 26th Rept. N. York State Cab. N. Hist., p. 151.
1874. Larva, (fig.) *Packard,* (quotes Lintner.) Amer. Naturalist, vol. 8, p. 692.
1881. Larva. *French.* Canad. Entom., vol. 13, p. 145.
FOOD PLANT. *Salix.*

Sub-fam. **Saturnidæ.**

Dryopteris rosea. Walk.
1887. Larva. *Grote.* Canad. Entom., vol. 19, p. 50.
FOOD PLANT. *Viburnum acerifolium.*

Drepanodes arcuata.
1889. Larva. *W. Beutenmüeller.* Entom. Amer., vol. 5, p. 38.

Sericaria mori. L. (Silk-worm, domesticated.)
1836. Life history, (figs.) Treatise Silk Manufact., (Lardner's Cyclop.)
1840. Larva, pupa, (fig.) *Westwood.* Intro. Mod. Class. In., vol. 2, p. 378, fig. 105.
1857. Life history, (figs.) *Chenu—Demarets.* Encyc. Hist. Nat. Papillons, vol. 2, pp. 7–16.
1863. Larva, cocoon. *W. F. Kirby.* Europ. Butt. and Moths, p. 133.
1864. Life history. *Jaeger.* Life N. Amer. Ins., p. 145.

1872. Life history, (figs.) *Figuier.* Insect World, p. 216.
1872. Life history, (figs.) *Riley.* 4th Missouri Rept., p. 75.
1880. Larva, cocoon, (figs.) *Riley.* Amer. Entom., vol. 1, 2d ser., p. 112.
1880. Larva, cocoon, (figs.) *W. C. Wyckoff,* (after Riley.) Loc. cit., pp. 112, 113.
1885. Egg, larva, (figs.) *Fernald.* Kingsley's Stand. N. Hist., vol. 2, pp. 434, 460.
1886. Life history, (figs.) *Riley.* Dept. Agr. Bull. No. 9.

FOOD PLANTS. *Osage Orange, Rubus, etc.,* (Morris.)

Actias luna. L.

1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 95, pl. 48.
1837. Larva. *Westwood,* (quotes Abb.–Sm.) in Drury Ill. Exot. Entom., vol. 1, p. 45.
1841. Larva, pupa. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 277.
1852. Larva. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 297.
1854. Larva, pupa, (col'd figs.) *Emmons.* Nat. Hist. N. York, vol. 5, p. 233, pl. 39.
1856. Larva. *Fitch.* 3d Rept. Ins. N. York, p. 452.
1859. Larva, cocoon. *Clemens.* Jour. Acad. Sc. Philad., July.
1862. Larva. *Morris.* Synop. N. Amer. Lep., p. 225.
1862. Larva, cocoon. *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 382.
1865. Cocoon, (brief.) *Grote.* Amer. Entom., p. 13.
1867. Larva. *Tenney.* Nat. Hist., p. 401.
1869. Egg. *Minot.* Canad. Entom., vol. 2, p. 27.
1869. Larva, (fig.) *Harris.* Entom. Corres., p. 293, pl. 4.
1872. Life history, (figs.) *Riley.* 4th Missouri Rept., p. 123.
1872. Egg, larval stages. *Lintner.* 26th Rept. N. York State Cab. N. Hist. p. 126.
1874. Larva, (fig.) *J. G. Wood.* Insects Abroad, p. 674.
1874. Larva. *Gentry.* Canad. Entom., vol. 6, p. 86.
1875. Life history. *R. V. Rogers.* Canad. Entom., pp. 141–199.
1875. Egg, larva, cocoon. *R. V. Rogers.* Rept. Entom. Soc. Ontario, p. 43.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 192.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 124.
1880. Larva, (fig.) *Coquillett,* (quotes Lintner.) Trans. Dept. Agr. Ill., vol. 18, Append., p. 178.
1881. Larva, (brief.) *Packard.* Ins. Inj. Forest Trees, p. 76.
1882. Larva, brief, (fig.) *J. A. Moffat.* Rept. Entom. Soc. Ontario, p. 29.
1885. Egg, larva, cocoon. *Fernald.* Kingsley's Stand. N. Hist., vol. 2, p. 458.

FOOD PLANTS. *Juglans, Liquidambar, Betula, Fagus, etc.*

Telea polyphemus. Cramer.

1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 93, pl. 47.
1840. Larva, (fig.) *P. H. Gosse.* Canad. Naturalist, p. 309.
1841. Larva, pupa. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 278.
1852. Larva. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 298.
1854. Larva. *Emmons.* Nat. Hist. N. York, vol. 5, p. 236.
1856. Larva. *Fitch.* 3d Rept. Ins. N. York, p. 455.
1859. Larva, cocoon. *Clemens.* Jour. Acad. N. Sc. Philad., July.
1862. Larva. *Morris.* Synop. Lep. N. Amer., p. 226.
1862. Larva, cocoon. *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 384.
1864. Larva. *Jaeger.* Life N. Amer. Ins., p. 159.
1872. Life history, (figs.) *Riley.* 4th Missouri Rept., p. 125.
1872. Egg. *Lintner.* 26th Rept. N. York State Cab. N. Hist., p. 152.
1874. Larva. *Gentry.* Canad. Entom., vol. 6, p. 86.
1875. Life history, (figs.) *Saunders.* Rept. Entom. Soc. Ontario, p. 41.
1879. Larva, cocoon, pupa, (figs.) *Mrs. Ballard.* Insect Lives, p. 45.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18., Append., p. 124.

1880. Larva. *D. Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 176.
1881. Larva, (fig.) *Packard.* Ins. Inj. Forest Trees, p. 47.
1882. Larva, (figs.) *Saunders.* Canad. Entom., vol. 14. p. 41.
1882. Larva, cocoon, (figs.) *Saunders.* Rept. Entom. Soc. Ontario, p. 15.
1883. Larva, cocoon, pupa, (figs.) *Saunders.* Ins. Inj. Fruits, p. 171.
1885. Egg, larva. *Fernald.* Kingsley's Stand. Nat. Hist., vol. 2, p. 457.
FOOD PLANTS. *Juglans, Tilia, Ulmus, Acer, Pyrus, Rosa, Prunus, etc.*

Attacus cinctus. Tepper.
1884. Cocoon. *Miss Murtfeldt.* Canad. Entom., vol. 16, p. 131.

Attacus yama-mai (domesticated).
1872. Life history, (figs.) *Riley.* 4th Missouri Rept, p. 130.
FOOD PLANTS. *Fagus, Pyrus, Castanea, Photinia, etc.*

Attacus cynthia. Drury.
1837. Larva, cocoon, pupa. *Westwood.* Drury's Ill. Exot. Entom., vol. 2, p. 13.
1858. Larva, (col'd fig.) *Duncan.* Natural. Library, p. 143.
1863. Larva, (fig.) *J. G. Wood.* Ill. Nat. Hist., p. 533.
1872. Egg, larva, cocoon. *Figuier.* Insect World, p. 247.
1872. Life history, (figs.) *Riley.* 4th Missouri Rept., p. 112.
1880. Life history, (figs.) *Riley.* Amer. Entom., vol. 1, 2d series, p. 56.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 125.
1885. Egg, larva, (figs.) *Fernald.* Kingsley's Stand. Nat. Hist., vol. 2, p. 457.
FOOD PLANTS. *Ailanthus, Castor-bean.*

Callosamia promethea. Drury.
1797. Larva, (col'd figs.) *Abbot—Smith.* Lep. Ins. Georgia, p. 91, pl. 46.
1833. Larva, cocoon, pupa, (figs.) *Peale.* Lep. Americana, pl. 3.
1837. Larva, cocoon. *Westwood,* (quotes Peale). Drury's Ill. Exot. Entom., vol. 2, p. 21.
1838. Larva, cocoon, pupa, (figs.) *Westwood,* (quotes Peale.) Introd. Entom., p. 402.
1841. Larva, pupa. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 281.
1852. Larva, cocoon. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 300.
1854. Egg, larva. *Emmons.* Nat. Hist. N. York, vol. 5, p. 238.
1856. Larva. *Fitch.* 3d Rept. Ins. N. York, p. 377.
1858. Larva, cocoon, pupa, (figs.) *Duncan.* Natural. Library, vol. 22, p. 136.
1859. Larva, cocoon. *Clemens.* Jour. Acad. N. Sc. Philad., July.
1862. Egg, larva. *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 391.
1862. Larva. *Morris.* Synop. N. Amer. Lep., p. 124.
1864. Egg, larva, cocoon. *Jaeger.* Life N. Amer. Ins., p. 162.
1867. Larva, cocoon. *Tenney.* Nat. Hist., p. 401.
1872. Egg, young larva. *Lintner.* 26th Rept. N. York State Cab. N. Hist., p. 126.
1872. Life history, (figs.) *Riley.* 4th Missouri Rept., p. 121.
1877. Larva. *French,* (quotes Harris.) Trans. Dept. Agr. Ill., vol. 15, p. 193.
1880. Larva, (fig.) *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 125.
1880. Larva, (fig.) *D. Coquillett,* (quotes Harris.) Trans. Dept. Agr. Ill., vol. 18, Append., p. 176.
1883. Egg, larval stages, cocoon, (figs.) *Saunders.* Canad. Entom., vol. 15, pl. 32, p. 231.
1883. Egg, larval stages, cocoon, (figs.) *Saunders.* Ins. Inj. Fruits, p. 205.
FOOD PLANTS. *Fraxinus, Sassafras, Liriodendron, Liquidambar, Acer, Prunus, Pyrus, etc.*

Platysamia cecropia. L.
1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 89, pl. 45.
1837. Larva, cocoon. *Westwood,* (quotes Abb.–Smith). Drury's Ill. Exot. Entom., vol. 1, p. 33.
1841. Larva, pupa. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 279.

1852. Larva. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 299.
1854. Larva, (col'd fig.) *Emmons.* Nat. Hist. N. York, vol. 5, p. 237, pl. 44.
1856. Larva. *Fitch.* 3d Rept. Ins. N. York, p. 338.
1858. Larva. *Duncan.* Natural. Library, vol. 22, p. 133.
1859. Larva, cocoon. *Clemens.* Jour. Acad. N. Sc. Philad., July.
1862. Larva. *Morris.* Synop. N. Amer. Lep., p. 224.
1862. Larva, cocoon, pupa, (figs.) *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 385.
1864. Larva, cocoon, (figs.) *Jaeger.* Life N. Amer. Ins., p. 155.
1867. Larva, pupa, (figs.) *Tenney.* Nat. Hist., p. 400.
1869. Larva. *Harris.* Entom. Corres., p. 294.
1870. Egg. *P. T. Sprague.* Canad. Entom., vol. 2, p. 82.
1871. Larva, cocoon. *Saunders.* Canad. Entom., vol. 3, p. 149.
1872. Egg, young larva. *Lintner.* 26th Rept. N. York State Cab. N. Hist., p. 125.
1872. Life history, (figs.) *Riley.* 4th Missouri Rept., p. 103.
1874. Life history, (figs.) *Saunders.* Rept. Entom. Soc. Ontario, p. 24.
1877. Life history. *Gentry.* Canad. Entom., vol. 9, p. 41.
1877. Larva. *French,* (quotes Harris.) Trans. Dept. Agr. Ill., vol. 15, p. 193.
1879. Larva, cocoon, pupa, (figs.) *Mrs. Ballard.* Insect Lives, p. 75.
1880. Larva, (fig.) *J. Marten.* Trans. Agr. Dept. Ill., vol. 18, Append., p. 126.
1880. Larva, (fig.) *D. Coquillett.* Trans. Agr. Dept. Ill., vol. 18, Append., p. 177.
1881. Larva, (fig.) *Packard,* (after Riley.) Ins. Inj. Forest Trees, p. 113.
1881. Larva, cocoon. *G. D. Hulst.* Bull. Brooklyn Entom. Soc., vol. 4. p. 57, hybrid between P. cecropia and P. ceanothi.
1883. Egg, larva, cocoon, (figs.) *Saunders.* Ins. Inj. Fruits, p. 75.
1885. Egg, larva. *Fernald.* Kingsley's Stand. Nat. Hist., vol. 2, p. 456.

FOOD PLANTS. *Pyrus, Prunus, etc.*

Platysamia columbia. Smith.

1871. Cocoon. *G. J. Bowles.* Canad. Entom., vol. 3, p. 203.
1878. Larva, (col'd fig.) *G. J. Bowles.* Canad. Entom., vol. 10, frontispiece.
1878. Larva, (fig.) *F. B. Caulfield.* Canad. Entom., vol. 10, p. 41.
1878. Life history. *Fernald.* Canad. Entom., vol. 10, p. 43.
1879. Larva, cocoon. *Hagen.* Bull. Buffalo Soc. Nat. Hist., p. 201.
1880. Larva. *D. Coquillett,* (quotes Caulfield.) Trans. Dept. Agr. Ill., vol. 18, Append., p. 177.

FOOD PLANT. *Larix americana.*

Platysamia gloveri. Strecker.

1878. Cocoon, pupa. *E. L. Graef.* Bull. Brooklyn Entom. Soc., vol. 1, p. 75.

Platysamia ceanothi. Behr.

1869. Larva, cocoon, pupa. *Boisduval.* Lep. Califor., p. 84.
1874. Larva, cocoon, pupa. *Hy. Edwards.* Proc. Cal. Acad. Sc., September.
1876. Larva, cocoon, pupa. *Strecker,* (quotes Hy. Edwards.) Lep. Rhopal. et Heteroc., p. 103.
1880. Larva. *A. Wailly.* Canad. Entom., vol. 12, p. 227.

FOOD PLANT. *Ceanothus thyrsiflorus.*

Saturnia mendocino. Behrens.

1878. Egg, larval stages. *Hy. Edwards.* Proc. Cal. Acad. Sc., January.

FOOD PLANT. *Arctostaphylos tomentosa.*

Saturnia galbina. Clemens.

1888. Egg, young larva, cocoon, pupa. *Hy. Edwards.* Entom. Amer., vol. 4, p. 61.

Pseudohazis eglanterina. Bois.

1833. Larva, (col'd fig.) *Titian Peale.* Lep. Americana, pl. 2.
1875. Egg, larva. *Hy. Edwards.* Proc. Cal. Acad. Sc., April.

FOOD PLANTS. *Rhamnus, Rosa.*

Hemileuca maia. Drury.

1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 99, pl. 50.
1837. Larva. *Westwood,* (quotes Abb.–Smith). Drury's Ill. Exot. Entom., vol. 2, p. 45.
1841. Larva, pupa. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 285.
1852. Larva. *Harris,* (quotes Abbot.) Ins. Inj. Vegetat., 2d edit., p. 306.
1854. Larva, (col'd figs.) *Emmons.* Nat. Hist. N. York, vol. 5, p. 232, pl. 39.
1858. Larva. *Duncan.* Natural. Library, vol. 22, p. 154.
1859. Larva. *Clemens.* Jour. Acad. N. Sc. Philad., July.
1862. Larva. *Morris.* Synop. Lep. N. Amer., p. 221.
1862. Larva. *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 396.
1869. Life history, (figs.) *Lintner.* 23d Rept. N. York State Cab. N. Hist., p. 137.
1873. Life history, (figs.) *Riley.* 5th Rept. Missouri, p. 127.
1873. Egg, larva, pupa, (figs.) *Packard,* (quotes Riley.) Amer. Naturalist, vol. 7, p. 475.
1877. Larva, (fig.) *Packard,* (after Riley.) Half-hours with Insects, p. 86.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 106.
1878. Larva, (brief.) *C. E. Worthington.* Canad. Entom., vol. 10, p. 16.
1880. Larva, pupa, (fig.) *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 127.
1880. Larva, pupa, (fig.) *D. Coquillett.* Trans. Dept. Agr. Ill., vol. 18. Append., p. 163.
1885. Larva. *C. T. Goodhue.* Canad. Entom., vol. 17, p. 243.

FOOD PLANT. *Quercus.*

Hemileuca nevadensis. Stretch.

1875. Larva. *Hy. Edwards.* Proc. Cal. Acad. Sc., April.
1888. Larva. *G. D. Hulst.* Entom. Amer., vol. 3, p. 191.

FOOD PLANT. *Salix.*

Hemileuca yavapai.

1880. Larva. *Hy. Edwards.* Entom. Amer., vol. 3, p. 167.

FOOD PLANT. *Prosopis juliflora.*

Hemileuca californica. Wright.

1888. Larva, (brief.) *W. G. Wright.* Canad. Entom., vol. 20, p. 34.

FOOD PLANT. *Salix.*

Hyperchiria io. Fabr.

1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 97, pl. 49.
1833. Larva, (col'd fig.) *Titian Peale.* Lep. Americana, pl. 6.
1841. Larva, pupa. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 284.
1852. Larva, cocoon. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 303.
1854. Larva. *Emmons.* Nat. Hist. N. York, vol. 5, p. 232.
1855. Larva. *T. Glover,* (quotes Harris.) Trans. N. York State Agr. Soc., p. 81.
1856. Larva. *Fitch.* 3d Rept. Ins. N. York, p. 379.
1858. Larva. *Fitch.* 5th Rept. Ins. N. York, p. 852.
1858. Larva. *Duncan.* Natural. Library, vol. 22, p. 157.
1859. Larva. *P. H. Gosse.* Letters from Alabama, p. 281.
1859. Larva. *Clemens.* Jour. Acad. N. Sc. Philad., July.
1862. Larva. *Morris.* Synop. Lep. N. Amer., p. 220.
1862. Larva, cocoon, (figs.) *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 393.
1864. Larva, (fig.) *Jaeger.* Life N. Amer. Ins., p. 124.
1869. Larva. *Bethune.* Canad. Entom., vol. 2, p. 19.
1869. Larva. *Harris.* Entom. Corres., p. 295.
1870. Larval stages. *Lintner.* 24th Rept. N. York State Cab. N. Hist., p. 146.
1873. Egg. *Riley.* Canad. Entom., vol. 5, p. 109.
1873. Life history, (figs.) *Riley.* 5th Missouri Rept., p. 133.
1873. Larva, (fig.) *Packard,* (quotes Riley.) Amer. Naturalist, vol. 7, p. 477.
1874. Larva, (fig.) *Saunders.* Canad. Entom., vol. 6, p. 227.

1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 121.
1881. Larva. *Packard.* Ins. Inj. Forest Trees, p. 45.
1887. Larva. *A. R. Grote.* Canad. Entom., vol. 19, p. 52.
FOOD PLANTS. Various species of *Quercus.*

Dryocampa rubicunda. Fabr.

1864. Larva. *B. D. Walsh,* description by Lintner. Proc. Entom. Soc. Philad., vol. 3, p. 426.
1870. Larva. *Saunders.* Canad. Entom., vol. 2, p. 75.
1870. Larva, (fig.) *T. Glover.* Rept. U. S. Dept. Agr., p. 83.
1872. Larva. *Lintner.* 26th Rept. N. York State Cab. N. Hist., p. 133.
1873. Life history, (figs.) *Riley.* 5th Missouri Rept., p. 137.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 196.
1879. Larva, pupa, (figs.) *Mrs. Ballard.* Insect Lives, p. 83.
1880. Larva, pupa, (figs.) *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 121.
1881. Larva, pupa, (figs.) *Packard,* (quotes Riley.) Ins. Inj. Forest Trees, p. 109.
1887. Larva. *A. R. Grote.* Canad. Entom., vol. 19, p. 52.
FOOD PLANTS. *Acer, etc.*

Clisiocampa californica. Park.

1869. Larva, (brief.) *Boisdural,* (as B. pseudoneustria.) Lep. Califor., p. 82.
1877. Larva, cocoon. *Packard,* (quotes Hy. Edwards in lit.) Inj. Ins. West, Hayden's Rept., p. 807.*
1881. Larva, cocoon. *Stretch.* Papilio, vol. 1, p. 64.
1881. Larva. *Packard,* (quotes Stretch.) Ins. Inj. Forest Trees, p. 41.
1881. Larva, cocoon. *Packard,* (quotes Hy. Edwards in lit.) Ins. Inj. Forest Trees, p. 43.*
FOOD PLANTS. *Quercus agrifolia, Rubus, etc.*
* NOTE.—This description was given by me to Dr. Packard in error as Gastropacha californica.—H. E.

Clisiocampa americana. Harris.

1796. Life history, (brief.) *Peck.* Proc. Mass. Agr. Soc.
1797. Larva, (col'd fig.) *Abbot—Smith,* (as B. castrenis.) Lep. Ins. Georgia, p. 119, pl. 60.
1826. Larva. *Harris.* N. Engl'd Farmer, vol. 4, p. 354.
1841. Larva, pupa. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 268.
1843. Larva. *W. Gaylord.* Trans. N. York State Agr. Soc. (prize essay), p. 152.
1852. Larva. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 286.
1854. Egg, larva, (figs.) *Emmons.* Nat. Hist. N. York, vol. 5, p. 235.
1856. Egg, larva, pupa, (figs.) *Fitch.* 2d Rept. Ins. N. York, p. 185.
1862. Egg, larva, cocoon, (figs.) *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 371.
1862. Larva, (brief.) *Packard.* Rept. Maine Board Agr., p. 170.
1864. Larva. *Jaeger.* Life N. Amer. Insects, p. 171.
1867. Larva, cocoon, (fig.) *Tenney.* Nat. Hist., p. 404, pl. 299.
1869. Larva. *Boisduval,* (as B. frutetorum.) Lep. Califor., p. 82.
1870. Egg, larva. *T. Glover.* Rept. U. S. Dept. Agr., p. 83.
1871. Egg, larva, cocoon, (figs.) *Riley.* 3d Missouri Rept., p. 118.
1872. Egg, larva, cocoon, (figs.) *Saunders.* Canad. Entom., vol. 4, p. 134.
1873. Egg, (fig.) *Riley.* 5th Missouri Rept., p. 56.
1873. Egg, larva, cocoon, (figs.) *A. J. Cook.* 12th Agr. Rept. Michigan, p. 131.
1875. Egg, larva, cocoon, pupa, (figs.) *Saunders.* Rept. Entom. Soc. Ontario, p. 30.
1876. Egg, larva, cocoon, (figs.) *G. H. Perkins.* Rept. Vermont Board. Agr., p. 586.
1877. Egg, larva, pupa, (figs.) *Packard.* Inj. Ins. West, Hayden's Rept., p. 793.
1877. Egg, larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 197.
1877. Egg, larva, cocoon, (fig.) *B. Gott.* Rept. Entom. Soc. Ontario, p. 41.
1877. Larva. *Packard.* Half-hours with Insects, p. 172.
1878. Egg. *Saunders.* Canad. Entom., vol. 10, p. 21.

Citheronia sepulcralis. G. and R.

1865. Larva. *Grote and Robinson.* Proc. Entom. Soc. Philad., vol. 4, p. 496.
1881. Larva. *Packard,* (quotes G. and R.) Ins. Inj. Forest Trees, p. 203.
1887. Larva. *Hy. Edwards.* Entom. Amer., vol. 3, p. 168.
FOOD PLANT. *Pinus.*

Citheronia mexicana. G. and R.

1888. Pupa. *Hy. Edwards.* Entom. Amer., vol. 4, p. 62.

Sphingicampa bicolor. Harris.

1863. Larva, pupa. Proc. Boston Soc. N. Hist., vol. 9, p. 292.
1864. Larva. *B. D. Walsh.* Proc. Entom. Soc. Philad., vol. 3, p. 425.
FOOD PLANT. *Gleditschia.*

Sphingicampa quadrilineata. G. and R.

1888. Pupa. *Hy. Edwards.* Entom. Amer., vol. 4, p. 62.

Anisota stigma. Fabr.

1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 111, pl. 56.
1841. Larva, pupa. *Harris,* (quotes Abb.–Sm.) Ins. Inj. Vegetat., 1st edit., p. 292.
1859. Larva. *Clemens.* Jour. Acad. N. Sc. Philad., July.
1859. Larva. *Fitch.* 5th Rept. Ins. N. York, p. 824.
1862. Larva, (brief.) *Morris.* Synop. Lep. N. Amer., p. 231.
1869. Larva, (fig.) *Harris.* Entom. Corres., p. 298, pl. 11.
1873. Larva. *Riley.* 5th Missouri Rept., p. 126.
1878. Larva. *W. V. Andrews.* Psyche, vol. 2, p. 272.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 120.
1887. Larva. *A. R. Grote.* Canad. Entom., vol. 19, p. 51.
FOOD PLANTS. Various species of *Quercus.*

Anisota senatoria. Abb.–Sm.

1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 113, pl. 57.
1837. Larva. *Westwood,* (quotes Abb.–Sm.) Drury's Ill. Exot. Entom., vol. 2, p. 25.
1841. Larva, pupa. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 292.
1852. Larva, pupa. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 311.
1859. Larva. *Fitch.* 5th Rept. Ins. N. York, p. 823.
1859. Larva. *Clemens.* Jour. Acad. N. Sc. Philad., July.
1862. Larva. *Morris.* Synop. Lep. N. Amer., p. 231.
1862. Larva, pupa, (fig.) *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 406.
1866. Larva. *B. D. Walsh.* Pract. Entom., vol. 2, p. 7.
1869. Larva, pupa, (fig.) *Harris.* Entom. Corres., pl. 11.
1870. Larva, (fig.) *T. Glover.* Rept. U. S. Dept. Agr., p. 82.
1870. Egg, larval stages. *Lintner.* 24th Rept. N. Y. State Cab. Nat. Hist., p. 155.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 196.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 120.
1880. Larva. *D. Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 161.
1881. Larva. *Packard.* Ins. Inj. Forest Trees, p. 45.
FOOD PLANTS. Various species of *Quercus.*

Anisota virginiensis, Drury; = **pellucida.** Abb.–Sm.

1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 115, pl. 58.
1841. Larva, pupa. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 293.
1852. Larva. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 313.
1854. Larva, pupa, (figs.) *Emmons.* Nat. Hist. N. York, vol. 5, pl. 36.
1859. Larva *Fitch.* 5th Rept. Ins. N. York, p. 824.
1859. Larva. *Clemens.* Jour. Acad. N. Sc. Philad., July.
1862. Larva. *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 407.
1862. Larva. *Morris.* Synop. Lep. N. Amer., p. 237.
1869. Larva. *Harris.* Entom. Corres., p. 298.
1880. Larva. *French.* 6th Rept. Ill. Norm. Univers., p. 45.

1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 121.
1881. Larva. *Packard.* Ins. Inj. Forest Trees, p. 45.
1887. Larva. *A. R. Grote.* Canad. Entom., vol. 19, p. 52.
FOOD PLANTS. Various species of *Quercus.*

Dryocampa rubicunda. Fabr.

1864. Larva. *B. D. Walsh,* description by Lintner. Proc. Entom. Soc. Philad., vol. 3, p. 426.
1870. Larva. *Saunders.* Canad. Entom., vol. 2, p. 75.
1870. Larva, (fig.) *T. Glover.* Rept. U. S. Dept. Agr., p. 83.
1872. Larva. *Lintner.* 26th Rept. N. York State Cab. N. Hist., p. 133.
1873. Life history, (figs.) *Riley.* 5th Missouri Rept., p. 137.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 196.
1879. Larva, pupa, (figs.) *Mrs. Ballard.* Insect Lives, p. 83.
1880. Larva, pupa, (figs.) *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 121.
1881. Larva, pupa, (figs.) *Packard,* (quotes Riley.) Ins. Inj. Forest Trees, p. 109.
1887. Larva. *A. R. Grote.* Canad. Entom., vol. 19, p. 52.
FOOD PLANTS. *Acer, etc.*

Clisiocampa californica. Park.

1869. Larva, (brief.) *Boisdural,* (as B. pseudoneustria.) Lep. Califor., p. 82.
1877. Larva, cocoon. *Packard,* (quotes Hy. Edwards in lit.) Inj. Ins. West, Hayden's Rept., p. 807.*
1881. Larva, cocoon. *Stretch.* Papilio, vol. 1, p. 64.
1881. Larva. *Packard,* (quotes Stretch.) Ins. Inj. Forest Trees, p. 41.
1881. Larva, cocoon. *Packard,* (quotes Hy. Edwards in lit.) Ins. Inj. Forest Trees, p. 43.*
FOOD PLANTS. *Quercus agrifolia, Rubus, etc.*
* NOTE.—This description was given by me to Dr. Packard in error as Gastropacha californica.—H. E.

Clisiocampa americana. Harris.

1796. Life history, (brief.) *Peck.* Proc. Mass. Agr. Soc.
1797. Larva, (col'd fig.) *Abbot—Smith,* (as B. castrenis.) Lep. Ins. Georgia, p. 119, pl. 60.
1826. Larva. *Harris.* N. Engl'd Farmer, vol. 4, p. 354.
1841. Larva, pupa. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 268.
1843. Larva. *W. Gaylord.* Trans. N. York State Agr. Soc. (prize essay), p. 152.
1852. Larva. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 286.
1854. Egg, larva, (figs.) *Emmons.* Nat. Hist. N. York, vol. 5, p. 235.
1856. Egg, larva, pupa, (figs.) *Fitch.* 2d Rept. Ins. N. York, p. 185.
1862. Egg, larva, cocoon, (figs.) *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 371.
1862. Larva, (brief.) *Packard.* Rept. Maine Board Agr., p. 170.
1864. Larva. *Jaeger.* Life N. Amer. Insects, p. 171.
1867. Larva, cocoon, (fig.) *Tenney.* Nat. Hist., p. 404, pl. 299.
1869. Larva. *Boisduval,* (as B. frutetorum.) Lep. Califor., p. 82.
1870. Egg, larva. *T. Glover.* Rept. U. S. Dept. Agr., p. 83.
1871. Egg, larva, cocoon, (figs.) *Riley.* 3d Missouri Rept., p. 118.
1872. Egg, larva, cocoon, (figs.) *Saunders.* Canad. Entom., vol. 4, p. 134.
1873. Egg, (fig.) *Riley.* 5th Missouri Rept., p. 56.
1873. Egg, larva, cocoon, (figs.) *A. J. Cook.* 12th Agr. Rept. Michigan, p. 131.
1875. Egg, larva, cocoon, pupa, (figs.) *Saunders.* Rept. Entom. Soc. Ontario, p. 30.
1876. Egg, larva, cocoon, (figs.) *G. H. Perkins.* Rept. Vermont Board. Agr., p. 586.
1877. Egg, larva, pupa, (figs.) *Packard.* Inj. Ins. West, Hayden's Rept., p. 793.
1877. Egg, larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 197.
1877. Egg, larva, cocoon, (fig.) *B. Gott.* Rept. Entom. Soc. Ontario, p. 41.
1877. Larva. *Packard.* Half-hours with Insects, p. 172.
1878. Egg. *Saunders.* Canad. Entom., vol. 10, p. 21.

1879. Egg, larva, cocoon, (figs.) *H. Cutting.* N. Hamp. Board Agr., p. 17.
1880. Egg, larva, cocoon, (figs.) *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 122.
1880. Egg, larva, cocoon, (figs.) *D. Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 155.
1883. Egg, larva, cocoon, (figs.) *Saunders.* Ins. Inj. Fruits, p. 48.
1887. Egg, larva, pupa, (figs.) *J. Fletcher.* Rept. Entom. Dept. Agr. Can., p. 24.
1888. Egg, larva, cocoon, (figs.) *J. Fletcher.* Rept. Bot. Entom. Dept. Agr. Canada, p. 24.
1889. Egg, larva, cocoon, (figs.) *J. Fletcher.* Canad. Entom., vol. 21, p. 74.

FOOD PLANTS. Various trees and shrubs.

Clisiocampa constricta. Stretch.

1874. Larva, cocoon, pupa. *Hy. Edwards.* Proc. Cal. Acad. Sc., September.
1881. Larva, cocoon. *Stretch.* Papilio, vol. p. 65.
1881. Larva. *Packard,* (quotes Hy. Edwards.) Ins. Inj. Forest Trees, p. 41.

FOOD PLANT. *Quercus sonomensis.*

Clisiocampa erosa. Stretch.

1881. Cocoon. *Stretch,* (quotes Hy. Edwards in lit.) Papilio, vol. 1, p. 67.

Clisiocampa disstria. Hübn.=**Sylvatica.** Harris.

1797. Larva, (col'd fig.) *Abbot—Smith,* (as G. neustria.) Lep. Ins. Georgia, p. 117, pl. 59.
1841. Larva, pupa. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 271.
1844. Larva. *Harris.* N. Eng'd Farmer, vol. 22, p. 412.
1852. Larva, cocoon. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 291.
1854. Larva, cocoon, (figs.) *Emmons,* (as B. neustria.) Nat. Hist. N. York, vol. 5, p. 240.
1856. Larva. *Fitch.* 2d Rept. Ins. N. York, p. 198.
1858. Larval stages. *Fitch.* 5th Rept. Ins. N. York, p. 820.
1862. Larva, (figs.) *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 375.
1862. Larva. *Morris,* (quotes Harris.) Synop. N. Amer. Lep., p. 236.
1864. Larva. *Jaeger.* Life N. Amer. Ins., p. 173.
1869. Larva. *Harris.* Entom. Corres., p. 292.
1871. Egg, larva, (fig'd.) *Riley.* 3d Missouri Rept., p. 121.
1874. Larva, (fig.) *J. G. Wood.* Insects Abroad, p. 680.
1875. Larva, (fig.) *Saunders,* Rept. Entom. Soc. Ontario, p. 30.
1877. Larva. *B. Gott.* Rept. Entom. Soc. Ontario, p. 41.
1877. Egg, larva, (figs.) *Packard.* Inj. Ins. West, Hayden's Rept., p. 794.
1878. Egg, larva, (figs.) *G. H. Perkins.* Rept. Vermont Board Agr., p. 258.
1878. Egg, larva, (figs.) *Saunders.* Rept. Entom. Soc. Ontario, p. 28.
1879. Egg, larva, (figs.) *H. Cutting.* N. Hamp. Board Agr., p. 20.
1878. Egg. *Saunders.* Canad. Entom., vol. 10, p. 21.
1880. Larva, (fig.) *J. Marten,* (quotes Fitch.) Trans. Dept. Agr. Ill., vol. 18, Append., p. 124.
1880. Larva. *French.* 6th Rept. Ill. Norm. Univ., p. 44.
1881. Egg, larva, (figs.) *Packard,* (quotes Fitch.) Ins. Inj. Forest Trees, p. 40.
1883. Egg, larva, cocoon, (figs.) *Saunders.* Ins. Inj. Fruits, p. 53.
1887. Egg, larva, (figs.) *J. Fletcher.* Rept. Entom. Dept. Agr. Can., p. 24.
1888. Egg, larva, cocoon. *J. Fletcher.* Rept. Bot. Ent. Dept. Agr. Canada, p. 24.

FOOD PLANTS. *Pyrus, Prunus, Quercus, etc.*

Clisiocampa fragilis. Stretch.

1888. Cocoon. *Hy. Edwards.* Entom. Amer., vol. 4, p. 62.

Gastropacha americana. Harris.

1797. Larva, (col'd fig.) *Abbot—Smith,* (as B. ilicifolia.) Lep. Ins. Georgia, p. 101, pl. 51.
1841. Larva, pupa. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 273.
1852. Larva. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 293.

1856. Larva. *Fitch.* 3d Rept. Ins. N. York, pp. 337, 380.
1862. Larva. *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 377.
1869. Larva. *Harris.* Entom. Corres., p. 292.
1872. Larva. *Lintner.* 26th Rept. N. York State Cab. N. Hist., p. 154.
1874. Egg. *H. H. Lyman.* Canad. Entom., vol. 6, p. 158.
1880. Larva. *D. Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 166.
1863. Egg, larva, cocoon. *Saunders.* Ins. Inj. Fruits, p. 87.
FOOD PLANTS. *Pyrus, Fraxinus, Quercus.*

Tolype velleda. Stoll.
1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 103, pl. 52.
1841. Larva, pupa. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 274.
1848. Larva. *Miss Dix.* Silliman's Jour. of Sc. and Art, vol. 19, p. 62.
1852. Larva. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 293.
1856. Larva. *Fitch.* 3d Rept. Ins. N. York, p. 338.
1862. Young larva. *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 379.
1869. Larva. *Harris.* Entom. Corres., p. 293.
1872. Larva. *Lintner.* 26th Rept. N. York State Cab. N. Hist., p. 134.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 197.
1880. Larva. *D. Coquillett,* (quotes Lintner.) Trans. Dept. Agr. Ill., vol. 18, Append., p. 166.
1883. Larva. *Edwards—Elliot.* Papilio, vol. 3, p. 130.
1883. Egg. *Hy. Edwards.* Papilio, vol. 3, p. 189.
1883. Larva, cocoon, (figs.) *Saunders.* Ins. Inj. Fruits, p. 89.
FOOD PLANTS. *Populus, Prunus, etc.*

Tolype laricis. Fitch.
1856. Life history. *Fitch.* 2d. Rept. Ins. N. York, p. 264.
1881. Larva, cocoon. *Packard,* (quotes Fitch.) Ins. Inj. Forest Trees, p. 254.
1883. Cocoon, (brief.) *H. R. Gilbert.* Papilio, vol. 3, p. 25.
1883. Larva. *Edwards—Elliot.* Papilio, vol. 3, p. 131.
FOOD PLANT. *Larix americana.*

Sub-fam. **Cossidæ.**

Cossus centerensis. Lintner.
1879. Life history. *Jas. S. Bailey.* Canad. Entom., vol. 11, p. 1.
1880. Larva. *D. Coquillett,* (quotes Bailey.) Trans. Dept. Agr. Ill., vol. 18, Append., p. 151.
1881. Larva, pupa. *Packard,* (quotes Bailey.) Ins. Inj. Forest Trees, p. 120.
1883. Pupa, (brief.) *J. Fletcher.* Canad. Entom., vol. 15, p. 203.
1883. Life history, (col'd figs.) *Jas. S. Bailey.* Bull. U. S. Dept. Agr., No. 3, p. 50.
1885. Pupa, (figs.) *Lintner.* 2d Rept. State Entom. N. York, p. 216.
FOOD PLANT. *Populus tremuloides.*

Cossus alni. Kellicott. (New sp.?)
1885. Larva. *D. Kellicott.* Entom. Amer., vol. 1, p. 175.

Prionoxystus robiniæ. Peck.
1821. Life history, (brief,) (figs.) *Peck.* Mass. Agr. Repos. and Jour., vol. 5, p. 67.
1841. Larva, pupa. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 296.
1852. Life history. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 316.
1858. Life history. *Fitch.* 5th Rept. Ins. N. York, p. 784.
1862. Larva, pupa, (figs.) *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 411
1877. Larva. *Packard.* Half-hours with Insects, p. 239.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 198.
1880. Larva. *D. Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 152.
1881. Egg, larva, pupa. *Packard.* Ins. Inj. Forest Trees, p. 7.
1881. Larva, pupa, (brief.) *D. Kellicott.* Bull. Buffalo Soc. N. Hist., vol. 4, p. 30.
FEEDS in trunks of *Quercus, Robinia, Populus, Salix, etc.*

Zeuzera æsculi. Linn.

1829. Larva, pupa. *Stephens.* Illust. Brit. Entom., Hawkes, vol. 2, p. 8.
1829. Larva, (fig.) *A. Matthews.* Mag. Nat. Hist., vol. 2, p. 66.
1829. Larva, (fig.) *D. G. Kerridge.* Mag. Nat. Hist., vol. 2, p. 292.
1837. Larva, pupa. *Kollar.* Ins. Inj. Vegetat., Loudon's edit., p. 208.
1839. Larva, (col'd fig.) *Curtis.* Brit. Entom., vol. 16, pl. 722.
1840. Larva, pupa, (col'd figs.) *Ratzeburg.* Die Forst-Insecten, vol. 2, p. 88, pl. 3, 4.
1840. Larva, (brief.) *Westwood.* Intr. Mod. Class. Ins., vol. 2, p. 378.
1857. Larva. *Chenu—Demarets.* Encyc. Hist. Nat. Papillons, vol. 2, p. 44.
1858. Larva, (col'd fig.) *Duncan.* Nat. Library, vol. 30, p. 185, pl. 15.
1859. Larva. *H. T. Stainton.* Brit. Butt. Moths, vol, 1, p. 113.
1859. Larva, (col'd fig.) *Humphreys.* Genera Brit. Moths, vol. 1, p. 15, pl. 4.
1869. Larva. *Newman.* British Moths, p. 18.
1872. Larva, (fig.) *J. G. Wood.* Insects at Home, p. 428.
1879. Egg, larva, pupa, (figs.) *Miss E. A. Ormerod.* Rept. Inj. Ins., p. 23.
1882. Larva, (col'd fig.) *W. F. Kirby.* Europ. Butt. and Moths, p. 113, pl. 26.

FEEDS in trunk and branches of *Quercus, Salix, Populus, etc.*

Cossula magnifica. Bailey.

1882. Life history, (brief.) *J. S. Bailey.* Papilio, vol. 2, p. 94.
1883. Pupa, (col'd fig.) *J. S. Bailey.* Bull. Dept. Agr., No. 3, pl. 2.

FOOD PLANT. *Quercus virens.*

Sub-fam. **Hepialidæ.**

Hepialus argenteomaculatus. Harris.

1840. Egg, (brief.) *P. H. Gosse.* Canad. Naturalist, p. 248.
1888. Larva, notes on. *D. S. Kellicott.* Entom. Amer., vol. 4, p. 153.
1889. Life history. *D. S. Kellicott.* Insect Life, vol. 1, p. 250.

NOCTUÆ.

Bombycia improvisa. Hy. Edwards.

1873. Pupa. *Hy. Edwards.* Proc. Cal. Acad. Sc., November.

Pseudothyatira cymatophoroides. Guen., (and var.)

1863. Larva. *A. R. Grote,* (quotes Cutler in lit.) Proc. Entom. Soc. Philad., vol. 2, p. 134.
1883. Larva. *R. Thaxter.* Papilio, vol. 3, p. 10.

FOOD PLANT. *Quercus.*

Habrosyne scripta. Gosse.

1883. Egg, larva. *R. Thaxter.* Papilio, vol. 3, p. 10.

FOOD PLANT. *Rubus.*

Platycerura furcilla. Packard.

1872. Larva, (fig.) *Lintner.* 26th Rept. N. York State Cab. N. Hist., p. 132.
1874. Larva, (fig.) *Packard,* (quotes Lintner.) Amer. Naturalist, vol. 8, p. 691.
1880. Larva. *D. Coquillett,* (quotes Lintner.) Trans. Dept. Agr. Ill., vol. 18, Append., p. 168.
1881. Larva. *Packard,* (quotes Lintner.) Ins. Inj. Forest Trees, p. 203.
1883. Larva, cocoon. *R. Thaxter.* Papilio, vol. 3, p. 11.
1885. Larva. *Fernald.* Kingsley's Stand. N. Hist., vol. 2, p. 453.

FOOD PLANTS. *Pinus, Tilia.*

Charadra propinquilinea. Grote.

1881. Larva. *L. W. Goodell.* Papilio, vol. 1, p. 15.
1883. Larva. *R. Thaxter.* Papilio, vol. 3, p. 12.

FOOD PLANTS. *Betula, Quercus, Carya.*

Charadra deridens. Guen.

1870. Larva. *Saunders.* Canad. Entom., vol. 2, p. 145.
1872. Larva, cocoon. *Lintner.* 26th Rept. N. York State Cab. N. Hist., p. 157.
1874. Larva, (fig.) *Packard,* (quotes Lintner.) Amer. Naturalist, vol. 8, p. 692.
1883. Larval stages, cocoon. *R. Thaxter.* Papilio, vol. 3, p. 11.

FOOD PLANT. *Quercus.*

Raphia frater. Grote.

1883. Larva. *R. Thaxter.* Papilio, vol. 3, p.13.

Apatela grisea. Walker.

1883. Larva. *Edwards—Elliot.* Papilio, vol. 3, p. 131.

FOOD PLANT. *Ulmus.*

Apatela falcula. Grote.

1881. Larva. *D. Coquillett.* Papilio, vol. 1., p. 6.

FOOD PLANT. *Corylus.*

Apatela occidentalis. G. and R.

1869. Larva. *Harris.* Entom. Corres., p. 311.

1872. Larva. *Saunders.* Canad. Entom., vol. 4, p. 49.

1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 129.

1883. Larva. *Edwards—Elliot.* Papilio, vol. 3, p. 83.

1883. Egg, larva, pupa, cocoon. *Saunders.* Ins. Inj. Fruits, p. 166.

FOOD PLANT. *Cerasus.*

Apatela lobeliæ. Guen.

1852. Larva. *Guen.* Spec. Gener. Noct., vol. 1, p. 44.

1881. Larva. *D. Coquillett.* Papilio, vol. 1, p. 6.

1886. Larva. *French.* Canad. Entom., vol. 18, p. 118.

FOOD PLANT. *Quercus.*

Apatela morula. G. and R.

1869. Larva, (fig.) *Harris.* Entom. Corres., p. 312, pl. 3, (as A. ulmi.)

1872. Larva. *Lintner.* 26th Rept. N. York State Cab. N. Hist., p. 137.

1883. Life history. *Thaxter.* Papilio, vol. 3, p. 14.

FOOD PLANT. *Ulmus.*

Apatela vulpina. Grote.

1883. Larva. *Thaxter.* Papilio, vol. 3, p. 14.

FOOD PLANTS. *Betula, Populus.*

Apatela radcliffei. Harvey.

1878. Larva, cocoon, pupa. *Thaxter.* Psyche, vol. 2, p. 121.

FOOD PLANT. *Prunus serotina.*

Apatela spinigera. Guen.

1878. Larva. *Thaxter.* Psyche, vol. 2, p. 121.

FOOD PLANTS. *Rubus, Betula.*

Apatela betulæ. Riley.

1884. Larva, pupa. *Riley.* Bull. Brooklyn Entom. Soc., vol. 7, p. 2.

FOOD PLANT. *Betula nigra.*

Apatela spinea. Gr.

1878. Egg, young larva. *Hy. Edwards.* Proc. Cal. Acad. Sc., June.

FOOD PLANT. *Lupinus.*

Apatela lepusculina. Guen.

1875. Larva. *Hy. Edwards.* Proc. Cal. Acad. Sc., April.

FOOD PLANT. *Populus.*

Apatela populi. Riley.

1870. Larva, pupa, (fig.) *Riley.* 2d Missouri Rept., p. 119.

1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 201.

1880. Larva, (fig.) *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 130.

1881. Larva, pupa, (fig.) *Packard,* (after Riley.) Ins. Inj. Forest Trees, p. 116.

1882. Larva, (fig.) *Saunders.* Canad. Entom., vol. 14, p. 221.

1883. Larva, (fig.) *Saunders.* Rept. Entom. Soc. Ontario, p. 24.

FOOD PLANT. *Populus.*

NOTE.—The two species (undoubtedly distinct), *A. lepusculina and A. populi,* have been confounded, and some of the descriptions of early stages of the latter have been given under the former name. *A. lepusculina* appears to be confined to the Pacific coast.—H. E.

Apatela felina. Grote.

1887. Larval stages, pupa. *French.* Canad. Entom., vol. 19, p. 49.

FOOD PLANT. *Salix.*

Apatela americana. Harris.

1797. Larva, (col'd fig.) *Abbot—Smith*, (as A. aceris.) Lep. Ins. Georgia, p. 185, pl. 93.

1841. Larva. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 317.

1852. Larva. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 337.

1852. Larva. *Guen.* Spec. Gener. Noct., vol. 1, p. 48, (as A. aceriola.)

1862. Larva, pupa, (figs.) *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 436.

1869. Larva, (fig.) *Harris.* Entom. Corres., p. 311, pl. 111.

1872. Larva. *Lintner.* 26th Rept. N. York State Cab. N. Hist., pp. 135, 157.

1875. Larva, (brief.) *Grote.* Bull. Buffalo Soc. N. Sc., vol. 2, p. 154.

1877. Larva. *French*, (quotes Harris.) Trans. Dept. Agr. Ill., vol. 15, p. 200.

1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 130.

1881. Larva. *D. Coquillett.* Papilio, vol. 1, p. 6.

1881. Larva. *Packard.* Ins. Inj. Forest Trees, p. 111.

FOOD PLANT. *Acer.*

Apatela hastulifera. Abb.-Sm.

1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 183, pl. 92.

1852. Larva. *Guen.* Spec. Gener. Noct., vol. 1, p. 47.

1872. Larva, cocoon. *Lintner.* 26th Rept. N. York State Cab. N. Hist., p. 158.

FOOD PLANTS. *Æsculus, Acer.*

Apatela rubricoma. Guen.

1852. Larva. *Guen.* Spec. Gener. Noct., vol. 1, p. 48.

1880. Larva *French.* 6th Rept. Ill. State Norm. Univer., p. 45.

1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 132.

FOOD PLANT. *Celtis crassifolia.*

Apatela luteicoma. G. and R.

1883. Larva. *Thaxter.* Papilio, vol. 3, p. 16.

FOOD PLANTS. *Tilia, Acer, Fraxinus.*

Apatela clarescens. Guen.

1869. Larva, (fig.) *Harris.* Entom. Corres., p. 313, pl. 4, (as A. pruni.)

FOOD PLANT. *Prunus.*

Apatela brumosa. Guen.

1852. Larva, (col'd fig.) *Guen*, (after Abbot, MS.) Spec. Gener. Noct., vol. 1, p. 52, pl. 2.

1881. Larva. *D. Coquillett.* Papilio, vol. 1, p. 56.

1883 Larva, pupa. *Saunders.* Ins. Inj. Fruit, p. 313.

1883. Larva. *Saunders.* Rept. Entom. Soc. Ontario, p. 12.

FOOD PLANTS. *Corylus, Prunus.*

Apatela noctivaga. Grote.

1883. Life history. *Thaxter.* Papilio, vol. 3, p. 15.

FOOD PLANT. *Populus.*

Apatela superans. Guen.

1871. Larva. *LeBaron.* 2d Illinois Rept., p. 51.

1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 131.

1881. Larva. *D. Coquillett.* Papilio, vol. 1, p. 6.

1883. Egg, larva, (fig.) *Saunders.* Ins. Inj. Fruits, p. 166.

FOOD PLANT. *Prunus.*

Apatela afflicta. Grote.

1883. Larva. *Thaxter.* Papilio, vol. 3, p. 17.

FOOD PLANT. *Quercus.*

Apatela hamamelis. Guen.

1852. Larva, (col'd fig.) *Guen*, (after Abb., MS.) Spec. Gener. Noct., vol. 1, p. 52, pl. 2.

1877. Larva, pupa. *L. W. Goodell.* Canad. Entom , vol. 9, p 61.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 131.
FOOD PLANT. *Castanea.*

Apatela lithospila. Grote.
1883. Larva. *Edwards—Elliot.* Papilio, vol. 3, p. 132.
FOOD PLANT. *Carya alba.*

Apatela oblinita. Abb.-Sm.
1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 187, pl. 94.
1852. Larva. *Guen.* Spec. Gener. Noct., vol. 1, p. 49.
1869. Larva, (fig.) *Packard.* Guide to Study of Ins., p. 304.
1871. Larva, pupa, (fig.) *Riley.* 3d Missouri Rept., p. 70.
1871. Larva, (fig.) *Saunders.* Canad. Entom., vol. 3, p. 226.
1872. Larva. *Lintner.* 26th Rept. N. York State Cab. N. Hist., p. 159.
1877. Larva. *French,* (quotes Riley.) Trans. Dept. Agr. Ill., vol. 15, p. 201.
1878. Larva, pupa, (figs.) *G. H. Perkins,* (after Riley.) 5th Rept. Vermont Board Agr., p. 275.
1878. Larva. *L. W. Goodell.* Canad. Entom., vol. 10, p. 66.
1880. Larva, cocoon, (figs.) *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 131.
1880. Larva, cocoon, (fig.) *D. Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 170.
1883. Larva, cocoon, pupa, (figs.) *S. A. Forbes.* Trans. Wisconsin Agr. Soc., vol. 21, p. 7.
1883. Larva, cocoon, (fig.) *Saunders.* Ins. Inj. Fruits, p. 325.
1885. Larva. *Fernald.* Kingsley's Stand. N. Hist., vol. 2, p. 452.
FOOD PLANTS. *Polygonum, Peach, Asparagus, etc.*

Arsilonche albovenosa. Grote. =**henrici.** Gr.
1877. Larva. *Thaxter.* Psyche, vol. 1, p. 188.
1880. Larva. *D. Coquillett.* Canad. Entom., vol. 12, p. 45.
1880. Larva. *D. Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 171.
1888. Larval stages. *Hy. Edwards.* Entom. Amer., vol. 3, p. 171.
FOOD PLANTS. *Polygonum, etc.*

Harrissimemna trisignata. Walk.
1869. Larva, pupa, (fig.) *Harris.* Entom. Corres., pp. 114, 174.
1869. Larva, (fig.) *Packard.* Guide to Study of Ins., p. 304.
1886. Larva. *C. F. Goodhue.* Canad. Entom., vol. 18, p. 58.
FOOD PLANT. *Syringa.*

Agrotis c. nigrum. Linn.
1829. Larva, pupa. *Stephens.* Illus. Brit. Entom., Haust., vol. 2, p. 136.
1859. Larva. *H. T. Stainton.* Brit. Butt., Moths, vol. 1, p. 234.
1877. Larva. *C. Thomas.* Trans. Dept. Agr. Ill., vol. 15, p. 89.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 202.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 132.
1880. Larva. *D. Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 184.
1882. Larva. *W. F. Kirby.* Europ. Butt. and Moths, p. 192.
1883. Larva. *Edwards—Elliot.* Papilio, vol. 3, p. 133.

Agrotis baja. S. V.
1829. Larva. *Stephens.* Illus. Brit. Entom., Haust., vol. 2, p. 134.
1859. Larva. *H. T. Stainton.* Brit. Butt., Moths, vol. 1, p. 237.
1882. Larva. *W. F. Kirby.* Europ. Butt. and Moths, p. 191.

Agrotis fennica. Tausch.
1884. Larva. *J. Fletcher.* Canad. Entom., vol. 16, p. 204.

Agrotis subgothica. Haw.
1869. Larva, (fig.) *Riley.* 1st Missouri Rept., p. 81.
1877. Larva. *C. Thomas.* Trans. Dept. Agr. Ill., vol. 15, p. 89,
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 204.

1877. Larva, (fig.) *Packard.* Half-hours with Insects, p. 22.
1879. Larva. *G. J. Bowles.* Rept. Entom. Soc. Ontario, p. 41.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 132.
1881. Larva. *F. W. Chase.* Trans. Wisconsin Agr. Soc., vol. 19, p. 482.
1883. Larva, (brief.) *Saunders.* Ins. Inj. Fruits, p. 328.

Agrotis tricosa. Lintner.

1869. Larva. *Riley.* 1st Missouri Rept., p. 82.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 132.

Agrotis herilis. Grote.

1877. Larva. *C. Thomas.* Trans. Dept. Agr. Ill., vol. 15, p. 90.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 205.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 133.

Agrotis plecta. Linn.

1829. Larva. *Stephens.* Illus. Brit. Entom., Haust., vol. 2, p. 137.
1859. Larva. *H. T. Stainton.* Brit. Butt., Moths, vol. 1, p. 234.
1882. Larva, (col'd fig.) *W. F. Kirby.* Europ. Butt. and Moths, p. 194, pl. 36.

Agrotis cupida. Grote.

1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 15, Append., p. 136.

Agrotis clandestina. Harris.

1841. Larva. *Harris,* (quotes Melsheimer in lit.) Ins. Inj. Vegetat., 1st edit., p. 325.
1869. Larva, (fig.) *Riley.* 1st Missouri Rept., p. 79.
1871. Larva. *Saunders.* Canad. Entom., vol. 3, p. 35.
1876. *G. H. Perkins.* 2d Rept. Vermont Board Agr., p. 597.
1877. Larva. *C. Thomas.* Trans. Dept. Agr. Ill., vol. 15, p. 95.
1877. Larva. *French,* (quotes Riley.) Trans. Dept. Agr. Ill., vol. 15, p. 213.
1877. Larva. *Packard.* Inj. Ins. West, Hayden's Rept., p. 717.
1877. Larva, (fig.) *Packard.* Half-hours with Insects, p. 23.
1879. Larva, (fig.) *G. J. Bowles,* (quotes Riley.) Rept. Entom. Soc. Ontario, p. 44.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 135.
1883. Larva, (brief), (fig.) *Saunders.* Ins. Inj. Fruits, p. 108.
1884. Larva, (brief), (fig.) *Riley.* Rept. Entom. U. S. Dept. Agr., p. 293, pl. 2, fig. 4.
1885. Larva, (fig.) *Lintner.* 44th Rept. N. York State Agr. Soc., p. 57.
1888. Larva, (fig.) *Lintner.* Bull. N. Y. State Museum, No. 6, p. 4.

Agrotis messoria. Harris.

1877. Larva. *C. Thomas.* Trans. Dept. Agr. Ill., vol. 15, p. 92.
1877. Larva, (fig.) *French.* Trans. Dept. Agr. Ill., vol. 15, p. 209.
1879. Larva, (fig.) *G. J. Bowles.* Rept. Entom. Soc. Ontario, p. 42.
1880. Larva, (fig.) *J. Marten.* Trans. Dept. Agr. Ill., vol. 15, Append., p. 134.
1881. Larva, (fig.) *F. W. Chase.* Trans. Wisconsin Agr. Soc., vol. 19, p. 484.
1883. Larva, (fig.) *Riley.* Amer. Naturalist, vol. 17, p. 422.
1884. Larva, (fig.) *Riley.* Rept. Entom. U. S. Dept. Agr., p. 290, pl. 2, fig. 6.
1886. Life history, (figs.) *Riley.* Rept. Entom. U. S. Dept. Agr.
1888. Larva, (fig.) *Lintner.* Bull. N. Y. State Museum, No. 6, p. 13.

Agrotis scandens. Riley.

1868. Larva, (figs.) *Riley.* 1st Missouri Rept., p. 76.
1877. Larva. *French,* (quotes Riley.) Trans. Dept. Agr. Ill., vol. 15, p. 208.
1879. Larva. *G. J. Bowles,* (quotes Riley.) Rept. Entom. Soc. Ontario, p. 43.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 133.
1883. Larva, (fig.) *Riley.* Amer. Naturalist, vol. 17, p. 422.
1883. Larva, (fig.) *Saunders.* Ins. Inj. Fruits, p. 108.

Agrotis pityochrous. Grote.

1889. Larva. *W. Beutenmüller.* Entom. Amer., vol. 5, p. 38.

Agrotis tesselata. Harris.

1863. Larva. *Fitch,* (as A. maizii.) 9th Rept. Ins. N. York, p. 804.

1877. Larva. *C. Thomas.* Trans. Dept. Agr. Ill., vol. 15, p. 91.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 206.
1879. Larva. *G. J. Bowles,* (quotes Fitch.) Rept. Entom. Soc. Ontario, p. 39.
1879. Larva. *W. A. Burkhou.* Agr. Pennsylv., p. 34.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 133.

Agrotis declarata. Walker.

1885. Larva. *Saunders.* Canad. Entom., vol. 17, p. 32.

Agrotis malefida. Guen.

1884. Life history, (fig.) *Riley.* Rept. Entom. U. S. Dept. Agr., p. 292, pl. 1, fig. 3.
1888. Larva, (fig.) *Lintner.* Bull. N. Y. State Museum, No. 6, p. 14.

Agrotis cochranii. Riley.

1869. Life history, (fig.) *Riley.* 1st Missouri Rept., p. 74.
1869. Larva. *Packard.* Guide to Study of Ins., p. 308.
1873. Larva, pupa, (figs.) *A. J. Cook.* 12th Rept. Michigan State Board Agr., p. 110.
1877. Larva, (fig.) *Packard.* Half-hours with Insects, p. 23.
1883. Larva, pupa, (brief.) *Saunders.* Ins. Inj. Fruits, p. 107.
1888. Larva, (fig.) *Bethune.* 18th Rept. Entom. Soc. Ontario, p. 57.

Agrotis annexa. Tr.

1852. Larva. *Guen.* Spec. Gener. Noct., vol. 1, p. 268.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 136.
1882. Life history. *French.* Canad. Entom., vol. 14, p. 207.
1884. Life history, (fig.) *Riley.* Rept. Entom. U. S. Dept. Agr., p. 291, pl. 2, fig. 1.
1885. Larva, pupa, (figs.) *Lintner.* 44th Rept. N. York State Agr. Soc., p. 62.
1888. Larva, pupa, (fig.) *Lintner.* Bull. N. Y. State Museum, No. 6, p. 12.

Agrotis ypsilon. Rott. = **suffusa.** S. V.

1829. Larva. *Stephens.* Illus. Brit. Entom., Haust., vol. 2, p. 149.
1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths, vol. 1, p. 223.
1869. Larva, (fig.) *Riley.* 1st Missouri Rept., p. 80.
1869. Larva, (fig.) *Packard.* Guide to Study of Ins., p. 306.
1877. Larva. *C. Thomas.* Trans. Dept. Agr. Ill., vol. 15, p. 93.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 210.
1877. Larva, (figs.) *Packard,* (quotes Riley.) Inj. Ins. West, Hayden's Rept., p. 717.
1879. Larva. *G. J. Bowles.* Rept. Entom. Soc. Ontario, p. 40.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 134.
1883. Larva, (fig.) *Saunders.* Ins. Inj. Fruits, p. 327.
1884. Egg, larva, (fig.) *Riley.* Rept. Entom. U. S. Dept. Agr., p. 294, pl. 2, fig. 2.
1888. Larva, (fig.) *Lintner.* Bull. N. Y. State Museum, No. 6, p. 15.
1888. Larva, (fig.) *Bethune.* 18th Rept. Entom. Soc. Ontario, p. 57.

Agrotis islandica. Standgr.

1873. Larva. *Packard.* In Hayden's Geol. Surv. Terr., p. 556.

Agrotis saucia. Hübn.

1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths, vol. 1, p. 224.
1869. Life history, (figs.) *Riley.* 1st Missouri Rept., p. 72.
1877. Larva. *C. Thomas.* Trans. Dept. Agr. Ill., vol. 15, p. 94.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 211.
1879. Larva. *G. J. Bowles,* (quotes Riley.) Rept. Entom. Soc. Ontario, p. 41.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 134.
1880. Larva, (brief.) *Riley.* Amer. Entomologist, 2d series, vol. 1, p. 298.
1882. Larva. *W. F. Kirby.* Europ. Butt. and Moths, p. 194.
1884. Life history, (brief.) *Riley.* Rept. Entom. U. S. Dept. Agr., p. 297, pl. 3, figs. 1, 2.

1885. Egg, (fig.) *Lintner.* 44th Rept. N. York State Agr. Soc., p. 59.
1885. Egg, larva. *Fernald.* Kingsley's Stand. N. Hist., vol. 2, p. 452.
1888. Egg, larva, (figs.) *Lintner.* Bull. N. Y. State Museum, No. 6, pp. 8, 16.

Agrotis lubricans. Guen.

1880. Larva. *French.* Canad. Entom., vol. 12, p. 14.
1880. Larva. *French.* 6th Rept. Ill. Norm. Univer., p. 45.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 135.

Agrotis prasina. Fabr.

1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths, vol. 1, p. 271.

Agrotis occulta. Hübn.

1829. Larva. *Stephens.* Ill. Brit. Entom., Haust., vol. 3, p. 29.
1829. Larva, (col'd figs.) *Curtis.* Brit. Entom., vol. 6, pl. 248.
1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths, vol. 1, p. 271.
1859. Larva, (col'd fig.) *Humphreys.* Genera Brit. Moths, vol. 1, pl. 21.
1882. Larva. *W. F. Kirby.* Europ. Butt. and Moths, p. 207.

NOTE.—The food plants of the species of Agrotis are usually grasses and low herbaceous plants. Many of the species are omnivorous.

Adita chionanthi. Abb.-Sm.

1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 195, pl. 98.
FOOD PLANT. *Chionanthus virginica.*

Mamestra adjuncta. Boisd.

1872. Larva. *Lintner.* 26th Rept. N. York State Cab. N. Hist., p. 161.
1877. Larva, pupa. *L. W. Goodell.* Canad. Entom., vol. 9, p. 61.
1880. Larva. *J. Marten,* (quotes Goodell.) Trans. Dept. Agr. Ill., vol. 18, Append., p. 136.
FOOD PLANT. *Solidago.*

Mamestra assimilis. Morrison.

1881. Larva. *L. W. Goodell.* Papilio, vol. 1, p. 15.
FOOD PLANT. *Solidago*

Mamestra picta. Harris.

1841. Larva. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 329.
1852. Larva. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 350.
1862. Larva, pupa, (figs.) *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 451.
1870. Life history, (fig.) *Riley.* 2d Missouri Rept., p. 112.
1871. Larva, (fig.) *Bethune.* Rept. Entom. Soc. Ontario, p. 426.
1872. Larva. *Lintner.* 26th Rept. N. York State Cab. N. Hist., p. 137.
1876. Larva. *C. Thomas.* Trans. Dept. Agr. Ill., vol. 14, p. 60.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 226.
1877. Larva, (fig.) *Packard,* (after Riley.) Inj. Ins. West, Hayden's Rept., p. 753.
1878. Larva, (fig.) *J. Stauffer.* Agr. Pennsylv., p. 239.
1879. Larva. *C. Thomas.* Trans. Dept. Agr. Ill., vol. 17, Append., p. 51.
1880. Larva, (fig.) *D. Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 185.
1883. Life history, (figs.) *Riley.* Rept. Entom. U. S. Dept. Agr., p. 124, pl. 1, fig. 3, and pl. 12, fig. 2.
1884. Larval stages. *Packard.* Amer. Naturalist, vol. 18.
1885. Larva. *Fernald.* Kingsley's Stand. N. Hist., vol. 2, p. 452.
1888. Larva, (fig.) *Lintner.* Bull. N. Y. State Museum, No. 6, p. 21.
FOOD PLANTS. Various.

Mamestra grandis. Boisd.

1883. Larva. *Thaxter.* Papilio vol. 3, p. 17.
FOOD PLANT. *Arctium lappa.*

Mamestra subjuncta. G. and R.

1869. Larva. *Riley.* 1st Missouri Rept., p. 85.

1877. Larva. *French*, (quotes Riley.) Trans. Dept. Agr. Ill., vol. 15, p. 44.
1879. Larva. *G. J. Bowles.* Rept. Entom. Soc. Ontario, p. 44.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 136.
FOOD PLANTS. *Cruciferæ.*

Mamestra distincta. Hübn.

1880. Larva. *French.* 6th Rept. Ill. Norm. Univ., p. 45.
1880. Larva, pupa. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 136.
FOOD PLANT. *Vitis.*

Mamestra laudabilis. Guen.

1852. Larva, pupa. *Guen.*, (quotes Abbot in lit.) Spec. Gener. Noct., vol. 2, p. 30.
FOOD PLANTS. *Leguminosæ.*

Mamestra trifolii. Rott.

1881. Larva. *D. Coquillett.* Papilio, vol. 1, p. 7.
1881. Larva. *French.* Canad. Entom., vol. 13, p. 23.
1882. Larva. *W. F. Kirby*, (as M. chenopodii.) Europ. Butt. and Moths, p. 224.
1883. Life history, (figs.) *Riley*, (as M. chenopodii.) Rept. Entom. U. S. Dept. Agr., p. 124, pl. 1, fig. 5, and pl. 12, fig. 1, (as M. trifolii.)
1888. Larva, pupa, (figs.) *Lintner.* Bull. N. York State Museum, No. 6, p. 9.
FOOD PLANTS. *Chenopodiaceæ.*

Mamestra renigera. Steph.

1869. Larva, (fig.) *Riley.* 1st Missouri Rept., p. 86.
1877. Larva, (fig.) *French.* Trans. Dept. Agr. Ill., vol. 15, p. 215.
1879. Larva, (brief.) *G. J. Bowles.* Rept. Entom. Soc. Ontario, p. 45.
1880. Larva, (fig.) *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 137.
1883. Larva. *Edwards—Elliot.* Papilio, vol. 3, p. 133.
FOOD PLANT. *Cichorium intybus.*

Hadena devastatrix. Brace.

Larva. *Brace.* Silliman's Jour. Sc. and Art, vol. 1, p. 154.
1852. Larva. *Harris*, (quotes Brace.) Ins. Inj. Vegetat., 2d edit., p. 345.
1862. Larva. *Harris*, (quotes Brace.) Ins. Inj. Vegetat., Flint's edit., p. 445.
1869. Larva, (fig.) *Riley.* 1st Missouri Rept., p. 83.
1877. Larva. *C. Thomas.* Trans. Dept. Agr. Ill., vol. 15, p. 96.
1877. Larva. *French*, (quotes Riley.) Trans. Dept. Agr. Ill., vol. 15, p. 216.
1879. Larva, (fig.) *G. J. Bowles*, (quotes Harris.) Rept. Entom. Soc. Ontario, p. 38.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 137.
1833. Larva, (fig.) *Saunders.* Ins. Inj. Fruits, p. 329.
1884. Life history, (brief.) *Riley.* Rept. Entom. U. S. Dept. Agr., p. 296, pl. 3, figs. 3, 4.
1885. Larva, (fig.) *Lintner.* 44th Rept. N. York State Agr. Soc., p. 58.
1888. Larva, (fig.) *Lintner.* Bull. N. York State Museum, No. 6, p. 5.
FOOD PLANTS. *Cruciferæ*, (chiefly).

Hadena arctica. Boisd.

1852. Larva. *Harris*, (as H. amica.) Ins. Inj. Vegetat., 2d edit., p. 339.
1856. Larva. *Fitch.* 3d Rept. Ins. N. York, p. 425.
1862. Larva. *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 450.
1865. Larva. *B. D. Walsh.* Prac. Entom., p. 22.
1869. Larva. *Harris.* Entom. Corres., p. 316.
1869. Egg. *Minot.* Canad. Entom., vol. 2, p. 28.
1870. Larva. *Saunders.* Canad. Entom., vol. 2, p. 75.
1877. Larva. *C. Thomas.* Trans. Dept. Agr. Ill., vol. 15, p. 96.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 217.
1879. Larva. *G. J. Bowles*, (quotes Harris.) Rept. Entom. Soc. Ontario, p. 39.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 137.

Hadena remissa. Hübn.

1882. Larva. *W. F. Kirby.* Europ. Butt. and Moths, p. 233.

Hadena turbulenta. Hübn.

1888. Larva. *W. Beutenmüller.* Canad. Entom., vol. 20, p. 136.

FOOD PLANT. *Smilax.*

Dipterygia scabriuscula. Linn.

1829. Larva, pupa. *Stephens.* Illus. Brit. Entom., Haust., vol. 2, p. 168.

1852. Larva. *Guen.* Spec. Gener. Noct., vol. 1, p. 147.

1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths, vol. 1, p. 201.

1859. Larva. *Humphreys.* Gen. Brit. Moths, p. 44.

1882. Larva. *W. F. Kirby.* Europ. Butt. and Moths, p. 237.

FOOD PLANT. *Rumex.*

Hyppa xylinoides. Guen.

1869. Life history. *Saunders.* Canad. Entom., vol. 2, p. 33.

1888. Larva, (brief.) *Lintner.* 4th Rept. State Entom., p. 138.

FOOD PLANTS. Various.

Polia vorax. Behrens.

1884. Larva, (brief.) *J. Behrens.* Papilio, vol. 4, p. 21.

Laphygma frugiperda. Abb.-Sm.

1796. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 191, pl. 96.

1852. Larva. *Guen,* (quotes Abbot.) Spec. Gener. Noct., vol. 1, p. 159.

1871. Egg, larva, (figs.) *Riley.* 3d Missouri Rept., p. 112.

1876. Larva, (fig.) *Riley.* 8th Missouri Rept., p. 48.

1877. Larva. *C. Thomas.* Trans. Dept. Agr. Ill., vol. 15, p. 97.

1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 219.

1880. Larva, (fig.) *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 138.

1885. Egg, larva, (fig.) *Hubbard.* Ins. Affecting Oranges, p. 150.

1885. Larva, pupa. *Gundlach.* Entom. Cubana, p. 288.

1888. Larva, (fig.) *Lintner.* Bull. N. York State Museum, No. 6, p. 14.

FOOD PLANTS. *Cereals, etc.*

Prodenia phytolaccæ. Abb.-Sm.

1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 193, pl. 97.

FOOD PLANT. *Phytolacca.*

Prodenia commelinæ. Abb.-Sm.

1796. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 189, pl. 95.

1852. Larva. *Guen,* (quotes Abb.-Sm.) Spec. Gener. Noct., vol. 1, p. 162.

1871. Larva, (fig.) *Riley.* 3d Missouri Rept., p. 113.

1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 220.

1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 138.

FOOD PLANTS. *Cereals.*

Prodenia lineatella. Harvey.

1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 139.

1881. Larva. *French.* Canad. Entom., vol. 13, p. 24.

FOOD PLANTS. *Rubus, Tragopogon, etc.*

Euplexia lucipara. Linn.

1829. Larva. *Stephens.* Illus. Brit. Entom., Haust., vol. 3, p. 4.

1836. Larva, (col'd fig.) *Curtis.* Brit. Entom., vol. 13, pl. 619.

1852. Larva. *Guen.* Spec. Gener. Noct., vol. 2, p. 68.

1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths, vol. 1, p. 270.

1859. Larva, (col'd fig.) *Humphreys.* Gener. Brit. Moths, vol. 1, pl. 20.

1882. Larva. *W. F. Kirby.* Europ. Butt. and Moths, p. 237.

1883. Larva. *Edwards—Elliot.* Papilio, vol. 3, p. 133.

FOOD PLANTS. *Viburnum, Betula, etc.*

Nephelodes minians. Guen.

1877. Larva. *C. Thomas.* Trans. Dept. Agr. Ill., vol. 15, p. 99.

1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 220.

1878. Larva. *French.* Canad. Entom., vol. 10, p. 61.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 139.
FOOD PLANTS. *Polygonaceæ, Gramineæ.*

Nephelodes violans. Guen.
1888. Larva. (fig.) *Lintner.* 4th Rept. State Entom. N. York, p. 54.

Apamea nictitans. Bkh.
1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths, vol. 1, p. 197.
1882. Larva. *W. F. Kirby.* Europ. Butt. and Moths, p. 180.
FOOD PLANTS. *Gramineæ.*

Apamea immanis. Guen.
1884. Larva, pupa, (fig.) *T. J. Edge.* Agr. Pennsylv., p. 106.
1885. Egg, larva. *Lintner.* 2d Rept. N. York State Entom., p. 42.

Gortyna Harrisii. Gr. = **leucostigma.**
1841. Larva. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 320.
1852. Larva. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 341.
1862. Larva. *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 440.
FOOD PLANT. *Aquilegia.*

Gortyna nitela. Guen.
1869. Larval stages, (figs.) *Riley.* 1st Missouri Rept., p. 92.
1869. Larva, (fig.) *Packard.* Guide to Study of Ins., p. 310.
1872. Larva, (fig.) *Le Baron.* 3d Illinois Rept., p. 141.
1876. Larva, (fig.) *G. H. Perkins.* 3d Rept. Vermont Board Agr., p. 556.
1877. Larva, pupa. *Emily A. Smith.* Trans. Dept. Agr. Ill., vol. 15, p. 113.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 221.
1877. Larva. *Packard.* Inj. Ins. West, Hayden's Rept., p. 719.
1879. Larva, (fig.) *Lintner.* Rept. N. York State Agr. Soc., p. 50.
1879. Larva, (fig.) *C. Thomas.* Trans. Dept. Agr. Ill., vol. 17, Append., p. 142.
1880. Larva, (fig.) *Emily A. Smith.* 7th Illinois Rept., p. 112.
1880. Larva, (fig.) *D. Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 151.
1880. Larva, (fig.) *A. Fuller,* (after Riley.) Amer. Entom., 2d ser., vol. 1, p. 201.
1883. Larva, (fig.) *S. A. Forbes.* Trans. Wisconsin Agr. Soc., p. 11.
1883. Larva, (fig.) *Saunders.* Ins. Inj. Fruits, p. 334.
1885. Larva. *Fernald.* Kingsley's Stand. N. Hist., vol. 2, p. 451.
FEEDS in stems of various plants.

Achatodes Zeæ. Harris.
1841. Larva. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 319.
1843. Larva. *Willis Gaylord.* Trans. N. York State Agr. Soc., p. 150.
1852. Larva. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 339.
1862. Larva, pupa. *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 438.
1867. Larva. *Tenney.* Nat. Hist., p. 406.
1869. Larva. *Packard.* Guide to Study of Ins., p. 311.
1877. Larva. *Packard,* (quotes Harris.) Inj. Ins. West, Hayden's Rept., p. 719.
1877. Larva. *C. Thomas.* Trans. Dept. Agr. Ill., vol. 15, p. 100.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 222.
1879. Larva, pupa. *W. A. Burkhart,* (quotes Harris.) Agr. Pennsylv., p. 35.
1883. Larva. *Edwards—Elliot.* Papilio, vol. 3, p. 134.
FEEDS in stems of *Sambucus, Zea, etc.*

Arzama obliquata. G. and R.
1878. Larva. *C. E. Worthington.* Canad. Entom., vol. 10, p. 15.
1888. Life history, (brief.) *H. H. Brehme.* Canad. Entom., vol. 20, p. 119.
FEEDS in stems of *Typha latifolia.*

Arzama melanopyga. Grote.
1881. Larva. *J. H. Comstock.* Papilio, vol. 1, p. 147.
FEEDS in stalks of *Nymphæa.*

Scolecocampa liburna. Geyer.

1852. Larva, (col'd fig.) *Guen*, (after Abbot, MS.) Spec. Gener. Noct., vol. 1, p. 131, pl. 2; (as S. ligni.)
1878. Larva. *W. V. Andrews.* Psyche, vol. 2, p. 272.
1883. Larva. *Edwards—Elliot.* Papilio, vol. 3, p. 134.

FEEDS in decaying stumps of Chestnut and other trees.

Euthisanotia timais. Cramer.

1852. Larva, (col'd fig.) *Guen.*, (after Abbot, MS.) Spec. Gener. Noct., vol. 1, p. 116, pl. 2.
1857. Larva, (fig.) *Chenu—Demarets.* Encycl. Hist. Nat. Papillons, vol. 2, p. 111.
1886. Larva, pupa. *Gundlach.* Entom. Cubana, p. 304.

FOOD PLANT. *Pancratium.*

Monodes nuciicolora. Guen.

1852. Larva. *Guen.* Spec. Gener. Noct., vol. 1, p. 241.

FOOD PLANTS. Various low herbs.

Heliophila pallens. Linn.

1829. Larva. *Stephens.* Illus. Brit. Entom., Haust., vol. 3, p. 76.
1852. Larva. *Guen.* Spec. Gener. Noct., vol. 1, p. 93.
1857. Larva. *Chenu—Demarets.* Encycl. Hist. Nat. Papillons, vol. 2, p. 76.
1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths, vol. 1, p. 190.
1882. Larva. *W. F. Kirby.* Europ. Butt. and Moths, p. 160.

FOOD PLANTS. *Gramineæ.*

Heliophila albilinea. Hübn.

1877. Life history, (figs.) *Riley.* 9th Missouri Rept., p. 50.
1877. Larva. *French*, (quotes Riley.) Trans. Dept. Agr. Ill., vol. 15, p. 223
1880. Larva. *D. Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 186.

FOOD PLANTS. *Cereals.*

Heliophila phragmitidicola. Guen.

1880. Larva. *French.* 6th Rept. Ill. State Norm. Univ., p. 46.
1880. Larva. *D. Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 186.

FOOD PLANTS. *Gramineæ.*

Heliophila pseudargyria. Guen.

1874. Larva. *Caulfield.* Canad. Entom., vol. 6, p. 132.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 139.
1881. Larva. *French.* Canad. Entom., vol. 13, p. 24.

FOOD PLANTS. *Gramineæ.*

Heliophila unipuncta. Haworth.

1860. Larva. *J. Kirkpatrick.* Agr. Rept. Ohio.
1860. Larva, pupa. (fig.) *B. D. Walsh.* Trans. Ill. Agr. Soc., vol. 4, pp. 350, 366.
1861. Larva, pupa. *Packard.* 6th Rept. Maine Board Agr., p. 132.
1862. Life history, (brief.) *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 627.
1865. Larva, pupa, (figs.) *B. D. Walsh.* Trans. Ill. Agr. Soc., vol. 5, p. 482.
1869. Larva. *Packard.* Guide to Study of Ins., p. 305.
1870. Life history, (figs.) *Riley.* 2d Missouri Rept., p. 37.
1870. Larva, (fig.) *T. Glover.* Rept. U. S. Dept. Agr., p. 83.
1871. Life history, (figs.) *Bethune.* Rept. Entom. Soc. Ontario, p. 402.
1875. Larva, pupa, (figs.) *A. J. Cook.* 14th Rept. Michigan Agr. Soc., p. 280.
1876. Larva, (brief.) *Saunders.* Rept. Entom. Soc. Ontario, p. 39.
1876. Egg, larva, pupa, (figs.) *Riley.* 8th Missouri Rept., pp. 32, 183.
1876. Larva, (brief.) *C. Thomas.* Trans. Dept. Agr. Ill., vol. 14, p. 56.
1877. Larva. *C. Thomas.* Trans. Dept. Agr. Ill., vol. 15, p. 81.
1877. Larva, pupa, (fig.) *C. Thomas.* Trans. Dept. Agr. Ill., vol. 15, p. 101.
1877. Larva, pupa. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 224.
1877. Larva. *Packard.* Half-hours with Insects, pp. 184, 217.
1877. Life history, (figs.) *Packard*, (quotes Riley and others.) Inj. Ins. West, Hayden's Rept., p. 699.

1877. Egg, larva, pupa, (figs.) *Riley*. Rept. Massachusetts Board Agr., p. 246.
1879. Egg, larva, pupa, (figs.) *J. H. Comstock*. Rept. U. S. Dept. Agr., p. 187.
1880. Larva, pupa, (figs.) *Riley*. Amer. Entom., 2d ser., vol. 1, p. 170.
1880. Life history, (figs.) *Riley*. 3d Rept. Entom. Comm., p. 89.
1880. Larva, (fig.) *J. Fletcher*. Rept. Entom. Soc. Ontario, p. 67.
1880. Larva, pupa, (figs.) *C. Thomas*. Trans. Dept. Agr. Ill., vol. 18, Append., pp. 5, 43.
1883. Larva, pupa, (figs.) *T. J. Edge*. Agr. Pennsylv., p. 73.
1885. Egg, larva, (fig.) *Fernald*. Kingsley's Stand. N. Hist., vol. 2, p. 451.
1885. Life history, (col'd figs.) *Riley*. 4th Rept. Entom. Comm.
1887. Larva, (fig.) *Fletcher*. Rept. Entom. Dept. Agr. Can., p. 11.
1888. Larva, (fig.) *J. Fletcher*. Rept. Entom. Bot. Dept. Agr. Canada, p. 11.

FOOD PLANTS. *Gramineæ*.

Pyrophila tragopoginis. Linn.

1829. Larva. *Stephens*. Illus. Brit. Entom., Haust., vol. 2, p. 165.
1852. Larva. *Guen*. Spec. Gener. Noct., vol. 2, p. 416.
1859. Larva. *H. T. Stainton*. Brit. Butt. and Moths, vol. 1, p. 311.
1859. Larva, (col'd fig.) *Humphreys*. Genera Brit. Moths, p. 44, pl. 17.
1870. Larva. *Saunders*. Canad. Entom., vol. 2, p. 73.
1871. Larva. *Saunders*, (as A. depressus.) Canad. Entom., vol. 3, p. 193.
1871. Larva. *Saunders*, (as A. depressus.) Rept. Entom. Soc. Ontario, p. 360.
1883. Larva, pupa. *Saunders*. Ins. Inj. Fruits, p. 275.

FOOD PLANTS. Various.

Pyrophila pyramidoides. Guen., (and vars.)

1852. Larva. *Guen*. Spec. Gener. Noct., vol. 2, p. 414.
1871. Larva, (figs.) *Riley*. 3d Missouri Rept., pp. 73, 75.
1871. Larva, (figs.) *Le Baron*, (after Riley.) 2d Ill. Rept., p. 56.
1871. Larva, (fig.) *Saunders*. Rept. Entom. Soc. Ontario, p. 360.
1874. Larva. *Saunders*. Canad. Entom., vol. 6, p. 27.
1875. Larva. *Saunders*. Canad. Entom., vol. 7, p. 14.
1877. Larva, cocoon, pupa, (fig.) *French*. Trans. Dept. Agr. Ill., vol. 15, p. 225.
1878. Larva. *G. H. Perkins*. 5th Rept. Vermont Board Agr., p. 273.
1880. Larva, (fig.) *D. Coquillett*. Trans. Dept. Agr. Ill., vol. 18, Append., p. 180.
1883. Larva, pupa, (fig.) *Saunders*. Ins. Inj. Fruits, p. 274.
1885. Larva. *Fernald*. Kingsley's Stand. N. Hist., vol. 2, p. 450.

FOOD PLANTS. *Vitis*, *Ampelopsis*.

Tæniocampa incerta. Hübn.

1852. Larva. *Guen*., (as T. hibisci.) Spec. Gener. Noct., vol. 1, p. 355.
1856. Larva. *Fitch*, (as Orth. instabilis.) 3d Rept. Ins. N. York, p. 343.
1859. Larva. *H. T. Stainton*, (as Orth. instabilis.) Brit. Butt. and Moths, vol. 1, p. 243.

FOOD PLANTS. *Quercus*, *Salix*, *Prunus*.

Zotheca tranquilla. Grote.

1878. Larva. *Hy. Edwards*. Proc. Cal. Acad. Sc., June.

FOOD PLANT. *Sambucus*.

Calymnia orina. Guen.

1873. Larva. *Saunders*. Canad. Entom., vol. 5, p. 206.
1881. Larva. *Packard*, (quotes Saunders.) Ins. Inj. Forest Trees, p. 47.

FOOD PLANT. *Quercus*.

Scoliopteryx libatrix. Linn.

1829. Larva. *Stephens*. Illus. Brit. Entom., Haust., vol. 3, p. 50.
1852. Larva. *Guen*. Spec. Gener. Noct., vol. 2, p. 406.
1859. Larva. *H. T. Stainton*. Brit. Butt. and Moths, vol. 1, p. 309.
1859. Larva, (col'd fig.) *Humphreys*. Genera Brit. Moths, pl. 25.
1860. Larva, (brief.) *Duncan*. Natural. Library, vol. 30, p. 232.
1872. Larva, (fig.) *J. G. Wood*. Insects at Home, p. 484.

1881. Larva. *D. Coquillett.* Papilio, vol. 1, p. 56.
1882. Larva, pupa, (brief.) *W. F. Kirby.* Europ. Butt. and Moths, p. 185.
FOOD PLANT. *Salix.*

Scopelosoma devia. Grote.
1884. Life history. *Thaxter.* Canad. Entom., vol. 16, p. 33.
FOOD PLANT. *Quercus.*

Scopelosoma morrisonii. Grote.
1884. Life history. *Thaxter.* Canad. Entom., vol. 16, p. 30.
FOOD PLANT. *Quercus.*

Scopelosoma vinulenta. Grote.
1884. Life history. *Thaxter.* Canad. Entom., vol. 16, p. 32.
FOOD PLANTS. *Quercus, Azalea.*

Scopelosoma walkeri. Grote.
1884. Life history. *Thaxter.* Canad. Entom., vol. 16, p. 31.
FOOD PLANT. *Quercus.*

Scopelosoma tristigmata. Grote.
1884. Life history. *Thaxter.* Canad. Entom , vol. 16, p. 33.
FOOD PLANT. *Quercus.*

Scopelosoma moffatiana. Gr. ·
1888. Larva. *R. F. Pearsall.* Entom. Amer., vol. 4, p. 59.

Lithophane antennata. Walker.= **cinerea.**
1871. Life history, (fig's.) *Riley.* 3d Missouri Rept., p. 135.
1877. Larva. *French,* (quotes Riley.) Trans. Dept. Agr. Ill., vol. 15, p. 227.
1883. Larva, (fig's.) *Saunders.* Ins. Inj. Fruits, p. 138.
FOOD PLANT. Various fruit trees and fruits.

Lithophane laticinerea. Grote.
1883. Larva. *Edwards—Elliot.* Papilio, vol. 3, p. 135.
FOOD PLANT *Cerasus.*

Calocampa nupera. Lintner.
1878. Larva. *Thaxter.* Psyche, vol. 2, p 122.

Calocampa curvimacula. Morrison.
1878. Larva. *Thaxter.* Psyche, vol. 2, p. 122.

Cucullia convexipennis. G. and R.
1869. Larva. *Lintner.* 23d Rept. N. York State Cab. N. Hist., p. 215.
1872. Larva. *Lintner.* 26th Rept. N. York State Cab. N. Hist., p. 138.
FOOD PLANT. *Solidago.*

Cucullia asterioides. Guen.
1872. Larva. *Lintner.* 26th Rept. N. York State Cab. N. Hist., p. 139.
FOOD PLANT. *Solidago.*

Cucullia intermedia. Speyer.
1869. Larva, pupa, (fig.) *Lintner.* 23d Rept. N. York State Cab. N. Hist., p. 213.
FOOD PLANT. Various species of *Compositæ.*

Adipsophanes miscellus. Grote.
1880. Larva. *D. Coquillett.* N. Amer. Entom., No. 7, p. 52.
1880. Larva. *D. Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 180.
FOOD PLANT. *Verbena.*

Crambodes talidiformis. Guen.
1880. Larva. *D. Coquillett.* N. Amer. Entom., No. 7, p. 52.
1880. Larva. *D. Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 180.
1883. Larva, cocoon. *Edwards—Elliot.* Papilio, vol. 3, p. 135.
FOOD PLANT. *Verbena.*

Nolaphana malana. Fitch.
1855. Larva. *Fitch.* 2d Rept. Ins. N. York, p. 242.
1856. Larva. *Fitch.* 3d Rept. Ins. N. York, p. 343.
1877. Larva. *Packard.* Half-hours with Insects, p. 181.

1883. Larva, cocoon. *Saunders.* Ins. Inj. Fruits, p. 101.
FOOD PLANT. *Pyrus, (apple.)*

Anomis erosa. Hübn.
1852. Larva. *Guen.* Spec. Gener. Noct., vol. 2, p. 395.
1885. Life history, (col'd figs.) *Riley.* 4th Rept. Entom. Comm.
1886. Larva, pupa. *Gundlach.* Entom. Cubana, p. 321.
FOOD PLANT. *Urena lobata.*

Aletia argillacea. Hübn.
1852. Larva. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 356.
1855. Egg, larva, pupa. *T. Glover.* Trans. N. York State Agr. Soc., p. 71.
1857. Larva, pupa. *Fitch.* 4th Rept. Ins. N. York.
1862. Larva. *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 457.
1869. Larva. *Packard.* Guide to Study of Ins., p. 313.
1870. Life history, (figs.) *Riley.* 2d Missouri Rept., p. 38.
1875. Larva, pupa. *Grote.* Rept. Geol. Alabama, p. 199.
1877. Egg, larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 228.
1877. Egg, larva, (figs.) *Packard,* (quotes Riley and Grote.) Inj. Ins. West, Hayden's Rept., p. 775.
1877. Egg, larva, (fig.) *Packard.* Half-hours with Insects, p. 221.
1879. Egg, larva, pupa, (col'd figs.) *J. H. Comstock.* Rept. on Cotton Ins., Dept. Agr., p. 75.
1880. Larva, pupa, (figs.) *Riley.* Amer. Entom., 2d series, vol. 1, p. 6.
1885. Life history, (col'd figs.) *Riley.* 4th Rept. U. S. Entom. Comm.
1885. Egg, larva. *Fernald.* Kingsley's Stand. N. Hist., vol. 2, p. 450.
FOOD PLANTS. *Malvaceæ.*

Ingura præpilata. Grote.
1883. Larva. *Edwards—Elliot.* Papilio, vol. 3, p. 135.
FOOD PLANT. *Liquidambar styraciflua.*

Ingura delineata. Guen.
1852. Larva. *Guen.,* (after Abb., MS.) Spec. Gener. Noct., vol. 2, p. 311.
1852. Larva, pupa. *Guen.* Spec. Gener. Noct., vol. 3, p. 397.
FOOD PLANT. *Tabernæmontana laurifolia.*

Calpe canadensis. Bethune.
1878. Larva. *Thaxter.* Psyche, vol. 2, p. 123.
1880. Larva. *D. Coquillett.* Canad. Entom., vol. 12, p. 44.
1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 137.
1880. Larva. *D. Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 172.
FOOD PLANT. *Thalictrum cornutum.*

Telesilla cinereola. Guen.
1880. Larva. *D. Coquillett.* N. Amer. Entom., No. 7, p. 52.
1880. Larva. *D. Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 180.
FOOD PLANT. *Ambrosia.*

Hypsoropha hormos. Hübn.
1852. Larva. *Guen.* Spec. Gener. Noct. vol. 2, p. 403.
FOOD PLANT. *Dyospyros virginiana.*

Plusia aereoides. Grote.
1876. Larva, pupa. *Thaxter.* Psyche, vol. 1, p. 188.
FOOD PLANT. *Spiræa salicifolia.*

Plusia balluca. Geyer.
1863. Larva. *Saunders.* Proc. Entom. Soc. Philad., vol. 2, p. 29.
1872. Cocoon, pupa. *Lintner.* 26th Rept. N. York State Cab. N. Hist., p. 163.
1873. Larva. *Saunders.* Canad. Entom., vol. 5, p. 10.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 228.

Plusia contexta. Grote.
1883. Life history. *Thaxter.* Papilio, vol. 3, p. 18.
FOOD PLANTS. *Gramineæ.*

Plusia putnami. Grote.

1883. Larva, (brief). *Thaxter.* Papilio, vol. 3, p. 19.

Plusia dyaus. Grote.

1885. Larva, pupa. *Lintner.* 2d Rept. State Entom. N. York, p. 94.

Plusia precationis. Guen.

1869. Larva. *Packard.* Guide to Study of Ins., p. 312.
1880. Larva. *D. Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 148.
1881. Life history. *D. Coquillett.* Canad. Entom., vol. 13, p. 21.
FOOD PLANTS. *Plantago, Arctium, Taraxacum, etc.*

Plusia brassicæ. Riley.

1870. Larva, pupa, (figs.) *Riley.* 2d Missouri Rept., p. 110.
1871. Larva, pupa, (figs.) *Bethune.* Rept. Entom. Soc. Ontario, p. 247.
1877. Larva, cocoon, pupa, (figs.) *Packard.* Inj. Ins. West, Hayden's Rept., p. 752.
1877. Larva. *French,* (quotes Riley.) Trans. Dept. Agr. Ill., vol. 15, p. 230.
1879. Larva. *C. Thomas.* Trans. Dept. Agr. Ill., vol. 17, p. 41.
1880. Larva, cocoon, pupa, (figs.) *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 140.
1883. Life history, (figs.) *Riley.* Rept. Entom. U. S. Dept. Agr., p. 119, pl. 11, figs. 2, 5.
1885. Larva, pupa, (fig.) *Lintner.* 2d Rept. State Entom. N. York, p. 90.
FOOD PLANTS. *Brassica* and other *Cruciferæ.*

Plusia hochenwarthii. Hoch.

1882. Larva. *W. F. Kirby.* Europ. Butt. and Moths, p. 266.

Plusia devergens. Hübn.

1882. Larva. *W. F. Kirby.* Europ. Butt. and Moths, p. 266.

Ararta cordigera. Thurb.

1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths, vol. 1, p. 293.
FOOD PLANT. *Vaccinium.*

Chloridea rhexiæ. Abb.–Sm.

1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 199, pl. 100.
1852. Larva. *Guen.* Spec. Gener. Noct., vol. 2, p. 175.
1858. Larva. *Duncan.* Natural. Library, vol. 22, p. 199.
1880. Larva. *French.* 6th Rept. Ill. State Norm. Univ., p. 46.
1880. Larva. *Riley.* Amer. Entom., 2d series, vol. 1, p. 7.
1886. Larva, pupa. *Gundlach.* Entom. Cubana, p. 310.
FOOD PLANTS. *Rhexia Virginica, Sesamum, Nicotiana.*

Alaria gauræ. Abb.–Sm.

1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 197, pl. 99.
1852. Larva. *Guen.* Spec. Gener. Noct., vol. 2, p. 170.
1858. Larva, (col'd fig.) *Duncan,* (quotes A. and S.) Natural. Library, vol. 22, p. 200, pl. 24.
FOOD PLANT. *Gaura biennis.*

Rhodophora florida. Guen.

1867. Larva. *Fitch.* 12th Rept. N. York State Agr. Soc., p. 900.
1869. Larva. *Saunders.* Canad. Entom., vol. 2, p. 6.
1871. Egg, young larva. *Saunders.* Canad. Entom., vol. 3, p. 76.
1885. Egg, larva. *Fernald.* Kingsley's Stand. N. Hist., vol. 2, p. 450.
FOOD PLANT. Flowers of *Œnothera biennis.*

Heliothis phlogophagus. G. and R, (and vars.)

1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 230.
1881. Larva. *D. Coquillett.* Papilio, vol. 1, p. 56.
FOOD PLANTS. *Graminæ.*

Heliothis armigera. Hübn.

1855. Egg, larva, pupa. *T. Glover.* Trans. N. York State Agr. Soc., p. 99.
1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths, vol. 1, p. 292.
1871. Egg, larva, (fig.) *Riley.* 3d Missouri Rept., p. 105.
1877. Egg, larva. *Packard.* Half-hours with Ins., p. 224.
1877. Larva. *Packard.* Inj. Ins. West, Hayden's Rept., p. 778.
1877. Larva. *C. Thomas.* Trans. Dept. Agr. Ill., vol. 15, p. 103.
1877. Larva, pupa. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 232.
1879. Life history, (col'd figs.) *J. H. Comstock.* Rept. Cotton Ins. Dept. Agr., p. 297.
1880. Egg, larva, cocoon, pupa, (figs.) *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 150.
1882. Larva. *W. F. Kirby.* Europ. Butt. and Moths, p. 225.
1883. Larva, cocoon, pupa, (figs.) *S. S. Rathvon.* Agr. Pennsylv., p. 238.
1885. Life history, (col'd figs.) *Riley.* 4th Rept. (U. S.) Entom. Comm.
1886. Larva, pupa. *Gundlach.* Entom. Cubana, p. 309.

FOOD PLANTS. *Cotton, Reseda.*

Pyrrhia exprimens. Hübn.

1872. Larva. *Lintner.* 26th Rept. N. York State Cab. N. Hist., p. 163.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 233.
1883. Larva, pupa. *Edwards—Elliot.* Papilio, vol. 3, p. 135.

FOOD PLANT. *Desmodium.*

Pyrrhia angulata. Grote.

1881. Larva. *Coquillett.* Papilio, vol. 1, p. 8.

FOOD PLANT. *Polygonum.*

Tarache erastrioides. Guen.

1881. Larva. *Coquillett.* Papilio, vol. 1, p. 8.
1883. Larva, (brief.) *Coquillett.* Papilio, vol. 3, p. 84.

FOOD PLANT. *Ambrosia.*

Tarache candefacta. Hübn.

1852. Larva, (col'd fig.) *Guen.* W. Spec. Gener. Noct., vol. 2, p. 26, pl. 2.
1883. Larva, (brief.) *Coquillett.* Papilio, vol. 3, p. 84.

FOOD PLANT. *Ambrosia.*

Tarache delecta. Walk.

1870. Larva, pupa, (fig.) *Packard,* (as Acon. metallica, after Abbot.) Amer. Naturalist, vol. 4, p. 229.
1888. Larva. *A. C. Weeks.* Entom. Amer., vol. 4, p. 46.

FOOD PLANT. *Hibiscus moschentos.*

Chamyris cerintha. Tr.

1881. Larva. *Coquillett.* Papilio, vol. 1, p. 56.

FOOD PLANT. *Pyrus.*

Eustrotia carneola. Guen.

1881. Larva. *Coquillett.* Papilio, vol. 1, p. 7.

FOOD PLANT. *Rumex.*

Xanthoptera semicrocea. Guen.

1852. Larva, (col'd fig.) *Guen.,* (after Abb., M. S.) Spec. Gener. Noct., pl. 2.
1869. Larva. *Packard.* Guide to Study of Ins., p. 316.
1874. Life history, (figs.) *Riley.* Canad. Entom., vol. 6, p. 208.

FOOD PLANT. *Sarracenia.*

Exyra rolandiana. Grote.

1877. Larva. *Thaxter.* Psyche, vol. 2, p. 39.

FOOD PLANT. *Sarracenia.*

Drasteria erechtea. Cram.

1868. Larva. *Saunders.* Canad. Entom., vol. 1, p. 4.
1869. Larva, (fig.) *Harris.* Entom. Corres., pp. 175, 318.
1869. Larva. *Packard.* Guide to Study of Ins., p. 317.

1875. Larva. *Saunders.* Rept. Entom. Soc. Ontario, p. 37.
1875. Egg. *Hy. Edwards.* Proc. Cal. Acad. Sc., April.
1875. Larva. *Saunders.* Canad. Entom., vol. 7, p. 116.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 233.
1880. Larva. *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 148.
1882. Larva. *Saunders.* 12th Rept. Entom. Soc. Ontario, p. 47.
1884. Life history. *French.* Papilio, vol. 4, p. 148.
1885. Larva. *Fernald.* Kingsley's Stand. N. Hist., vol. 2, p. 449.
FOOD PLANT. *Trifolium.*

Syneda graphica. Hübn.
1852. Larva, (col'd fig.) *Guen.*, (after Abb., MS.) Spec. Gener. Noct., vol. 3, p. 72, pl. 2.

Catocala epione. Drury.
1852. Larva. *Guen.* Spec. Gener. Noct., vol. 3, p. 93.
FOOD PLANT. *Quercus.*

Catocala desperata. Guen. = **vidua.** Abb.-Sm.
1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins Georgia, p. 181, pl. 91.
1852. Larva. *Guen.*, (quotes Abb.-Sm.) Spec. Gener. Noct., vol. 3, p. 95.
1888. Life history. *French.* Canad. Entom., vol. 20, p. 28.
FOOD PLANTS. *Carya, Quercus.*

Catocala flebilis. Grote.
1881. Larva, pupa. *D. Kellicott.* Papilio, vol. 1, p. 141.
FOOD PLANT. *Carya.*

Catocala relicta. Walk.
1888. Life history. *Howard L. Clark.* Canad. Entom., vol. 20, p. 17.
FOOD PLANT. *Salix.*

Catocala amatrix. Hübn.
1852. Larva. *Guen.* Spec. Gener. Noct., vol. 3, p. 86.
1881. Larva, (brief.) *Ph. Fischer.* Bull. Buffalo Soc. Nat. Hist., vol. 4, p. 62.
1881. Larva, pupa. *D. Kellicott.* Papilio, vol. 1, p. 142.
1884. Life history. *French.* Papilio, vol. 4, p. 8.
FOOD PLANT. *Populus.*

Catocala cara. Guen.
1881. Larva. *A. Koebele,* (as C. carissima.) Bull. Brooklyn Entom. Soc., vol. 4, p. 22.
FOOD PLANT. *Salix.*

Catocala concumbens. Walker.
1863. Larva. *Saunders.* Proc. Entom. Soc. Philad., vol. 2, p. 29.
FOOD PLANT. *Salix.*

Catocala meskei. Grote.
1883. Larva. *R. Bunker.* Canad. Entom., vol. 15, p. 100.
FOOD PLANT. *Populus.*

Catocala unijuga. Walker.
1881. Larva. *D. Kellicott.* Canad. Entom., vol. 13, p. 38.
FOOD PLANT. *Populus.*

Catocala parta. Guen.
1883. Larva. *Hy. Edwards.* Papilio, vol. 3, p. 24.
FOOD PLANT. *Salix.*

Catocala innubens. Guen.
1888. Life history. *French.* Canad. Entom., vol. 20, p. 170.

Catocala coccinata. Grote.
1881. Larva. *D. W. Coquillett.* Papilio, vol. 1, p. 56.
FOOD PLANT. *Quercus.*

Catocala ultronia. Hübn.
1852. Larva. *Guen.* Spec. Gener. Noct., vol. 3, p. 89.
1869. Larva. *Packard.* Guide to Study of Ins., p. 317.

1874. Larva. *Saunders.* Canad. Entom., vol. 6, p. 147.
1879. Larva, pupa, (brief.) *Saunders.* Rept. Entom. Soc. Ontario, p. 74.
1883. Larva, pupa, (figs.) *Saunders.* Ins. Inj. Fruits, p. 177.
FOOD PLANTS. *Prunus, Cornus, Quercus.*

Catocala ilia. Cram.
1852. Larva. *Guen.* Spec. Gener. Noct., vol. 3, p. 92.
1875. Larva. *Caulfield.* Canad. Entom., vol. 7, p. 208.
1881. Larva. *A. Koebele.* Bull. Brooklyn Entom. Soc., vol. 4, p. 22.
1884. Life history. *French.* Canad. Entom., vol. 16, p. 12.
FOOD PLANT. *Quercus.*

Catocala zoe. Behr.
1870. Larva, (brief.) *Behr.* Trans. Amer. Entom. Soc., p. 24.
FOOD PLANT. *Quercus.*

Catocala neogama. Abb.–Sm.
1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, pl. 88.
1852. Larva. *Guen.*, (quotes Abb.–Sm.) Spec. Gener. Noct., vol. 3, p. 96.
1858. Larva, (col'd fig.) *Duncan.* Natural. Library, vol. 27, p. 203, pl. 26.
FOOD PLANT. *Quercus.*

Catocala palæogama. Guen.
1888. Life history. *French.* Canad. Entom., vol. 20, p. 108.
FOOD PLANT. *Carya.*

Catocala muliercula. Guen.
1852. Larva, (col'd fig.) *Guen.*, (after Abb., M. S.) Spec. Gener. Noct., vol. 3, p. 97, pl. 2.
FOOD PLANTS. *Myrtaceæ.*

Catocala concors. Abb.–Sm.
1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 177, pl. 89.
1852. Larva. *Guen.* Spec. Gener. Noct., vol. 3, p. 99.
FOOD PLANTS. *Myrtaceæ, Leguminosæ.*

Catocala polygama. Guen.
1869. Larva. *E. B. Reed.* Canad. Entom., vol. 2, p. 30.
1876. Larva. *Saunders.* Canad. Entom., vol. 8, p. 74.
FOOD PLANT. *Cratægus.*

Catocala cratægi. Saunders.
1876. Larva. *Saunders.* Canad. Entom., vol. 8, p. 72.
FOOD PLANT. *Cratægus.*

Catocala amasia. Abb.–Sm.
1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 179, pl. 90.
1852. Larva. *Guen.*, (quotes Abb.–Sm.) Spec. Gener. Noct., vol. 3, p. 104.
1858. Larva. *Duncan.* Natural. Library, vol. 22, p. 205.
FOOD PLANT. *Melia azedarach.*

Catocala fratercula. G. and R.
1881. Larva. *Coquillett.* Papilio, vol. 1, p. 7.
FOOD PLANT. *Quercus.*

Catocala grynea. Cram.
1880. Larva. *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 183.
1881. Larva. *A. Koebele.* Bull. Brooklyn Entom. Soc., vol. 4, p. 22.
FOOD PLANT. *Pyrus.*

Catocala amica. Hübn.
1852. Larva. *Guen.* Spec. Gener. Noct., vol. 3, p. 106.
1880. Larva. *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 182.
1881. Larva. *Coquillett.* Papilio, vol. 1, p. 7.
FOOD PLANT. *Quercus.*

Parthenos nubilis. Hübn.
1869. Larva. *Harris.* Entom. Corres., p. 319.
FOOD PLANT. *Robinia.*

Allotria elonympha. Hübn.

1852. Larva. *Guen.* Spec. Gener. Noct., vol. 3, p. 37.

FOOD PLANTS. *Juglans, Glycine.*

Parallelia bistriaris. Hübn.

1852. Larva. *Guen.* Spec. Gener. Noct., vol. 3, p. 268.

1870. Larva. *Saunders.* Canad. Entom., vol. 2, p. 130.

1881. Larva. *Packard.* Ins. Inj. Forest Trees, p. 113.

1883. Larva. *Edwards—Elliot.* Papilio, vol. 3, p. 136.

FOOD PLANT. *Acer rubrum.*

Agnomonia anilis. Hübn.

1852. Larva, pupa. *Guen.* Spec. Gener. Noct., vol. 3, p. 274.

FOOD PLANT. *Chironia.*

Panopoda roseicosta. Guen.

1852. Larva. *Guen.* Spec. Gener. Noct., vol. 3, p. 325.

FOOD PLANT. *Juglans.*

Remigia latipes. Guen.

1852. Larva. *Guen.* Spec. Gener. Noct., vol. 3, p. 315.

1886. Larva, pupa. *Gundlach.* Entom. Cubana, p. 354.

FOOD PLANT. *Hypericum.*

Poaphila flavistriaria. Hübn.

1852. Larva, pupa, (col'd figs.) *Guen.* Spec. Gener. Noct., vol. 3, p. 302, pl. 2.

FOOD PLANT. *Scutellaria.*

Poaphila sylvarum. Guen.

1852. Larva. *Guen.*, (from Abb., MS.) Spec. Gener. Noct., vol. 3, p. 300.

FOOD PLANT. *Andromeda ferruginea.*

Poaphila quadrifilaris. Hübn.

1852. Larva. *Guen.* Spec. Gener. Noct., vol. 3, p. 300.

FOOD PLANT. *Gossypium.*

Erebus odora. Linn.

1886. Larva, pupa. *Gundlach.* Entom. Cubana, p. 367.

1887. Larva, (brief.) *H. T. Fernald.* Entom. Amer., vol. 3, p. 78.

1888. Egg, young larva. *H. T. Fernald,* (quotes Wm. Blake in MS.) Entom. Amer., vol. 4, p. 36.

FOOD PLANTS. *Cassia fistula, Pithecolobium, Saman.*

Pheocyma lunifera. Hübn.

1886. Larva, pupa. *Packard.* Bull. No. 12, U. S. Dept. Agr., p. 22.

FOOD PLANT. *Pinus.*

Ypsia aeruginosa. Guen.

1852. Larva, pupa. *Guen.* Spec. Gener. Noct., vol. 3, p. 17.

FOOD PLANT. *Cornus.*

Homoptera edusa. Drury, (and vars.)

1852. Larva, pupa, (col'd fig.) *Guen.*, (from Abb., MS.) Spec. Gener. Noct., vol. 3, pp. 13, 14, pl. 2.

1870. Larva, pupa, (fig.) *Packard.* Amer. Naturalist, vol. 4, p. 229.

1870. Larva. *Behr,* (as H. salicis.) Trans. Amer. Entom. Soc., p. 28.

1870. Larva. *Behr,* (as H. rosæ.) Loc. cit., p. 28.

1882. Life history. *French.* Canad. Entom., vol. 14, p. 130.

1888. Larva. *Lintner,* (quotes Guen.) 4th Report N. Y. State Entom., p. 58.

FOOD PLANTS. *Rosa, Salix, etc.*

Homoptera minerea. Guen.

1852. Larva, pupa. *Guen.* Spec. Gener. Noct., vol. 3, p. 15.

Homoptera calycanthata. Abb.–Sm.

1797. Larva, pupa, (col'd figs.) *Abbot—Smith.* Lep. Ins. Georgia, p. 104, pl. 207.

1852. Larva, pupa. *Guen.*, (quotes Abb.–Sm.) Spec. Gener. Noct., vol. 3, p. 15.

FOOD PLANT. *Calycanthus floridus.*

Pseudanthrœcia coracias. Guen.

1852. Larva, (col'd fig.) *Guen.* Spec. Gener. Noct., vol. 3, p. 19, pl. 2.

FOOD PLANT. *Quercus.*

Epizeuxis americalis.

1854. Larva, pupa. *Guen.* Spec. Gener. Delt. Pyral., vol. 8, p. 78.

FOOD PLANTS. *Leguminosæ.*

Epizeuxis aemul. Hübn.

1870. Larva, pupa, (figs). *Packard,* (as Helia æmulalis—after Abbot, MS.) Amer. Naturalist, vol. 4, p. 229.

1886. Larva, pupa. *Packard.* Rept. Entom. U. S. Dept. Agr., p. 326.

FOOD PLANT. *Phlox.*

Pseudaglossa lubricalis. Geyer.

1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 138.

1880. Larva. *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 182.

1880. Larva. *Coquillett.* Canad. Entom., vol. 12, p. 44.

FOOD PLANTS. *Gramineæ.*

Chytolita morbidalis. Guen.

1880. Larva. *Coquillett.* Canad. Entom., vol. 12, p. 44.

1880. Larva. *J. Marten.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 138.

1880. Larva. *Coquillett.* Loc. cit., p. 182.

FOOD PLANTS. *Corylus, Gramineæ.*

Philometra serraticornis. Grote.

1877. Larva, pupa. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 246.

FEEDS on roots of grasses.

Hypæna evanidalis. Robinson.

1856. Larva, pupa. *Fitch,* (as H. humuli.) 2d Rept. Ins. N. York, p. 324.

1880. Larva. *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 148.

FOOD PLANT. *Humulus.*

Hypæna scabra. Fabr. = **humuli.** Harris.

1841. Larva. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 345.

1862. Larva, cocoon. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 372.

1862. Larva, cocoon. *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 477.

1868. Larva, pupa, (figs.) *Packard.* Amer. Naturalist, vol. 2, p. 333.

1869. Larva, (fig.) *Packard.* Guide to Study of Ins., p. 327.

1869. Larva. *Harris.* Entom. Corres., p. 322.

1872. Larva. *Bethune.* Rept. Entom. Soc. Ontario.

1877. Larva, pupa, (figs.) *Packard.* Inj. Ins. West, Hayden's Rept., p. 773.

1877. Larva. *French,* (quotes Bethune.) Trans. Dept. Agr. Ill., vol. 15, p. 245.

1879. Larva, pupa. *J. H. Comstock.* Rept. Entom. Dept. Agr., p. 252.

1880. Larva. *Coquillett.* Canad. Entom., vol. 12, p. 43.

1880. Larva. *Riley.* Amer. Entom., 2d series, vol. 1, p. 8.

1880. Larva. *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 148.

1881. Life history. *Coquillett.* Canad. Entom., vol. 13, p. 137.

FOOD PLANTS. *Humulus, Trifolium, etc.*

Hypæna madefactalis. Guen.

1854. Larva. *Guen.* Spec. Gener. Delt. Pyral., vol. 8, p. 35.

FOOD PLANT. *Alisma plantago.*

GEOMETRIDÆ.

Choerodes clemitaria. Abb.–Sm.

1797. Larva, (col'd fig.) *Abbot—Smith.* Lep. Ins. Georgia, p. 201, pl. 101.

1876. Larva. *Packard.* Monogr. Geometr., p. 562.

1887. Larva, (brief.) *D. Bruce.* Entom. Amer., vol. 3, p. 47.

FOOD PLANTS. *Ulmus, Clematis, etc.*

Choerodes transversata. Drury.

1833. Larva, (col'd fig.) *Titian Peale.* Lep. Americana, pl. 9.

1876. Larva, pupa, (figs.) *Packard*, (after Abbot's MS. drawing.) Monogr. Geometr., p. 561, pl. 13.
1880. Larva, pupa. *L. W. Goodell.* Canad. Entom., vol. 12, p. 236.
1881. Larva. *Packard.* Ins. Inj. Forest Trees, p. 112.
1887. Larva, (brief.) *D. Bruce.* Entom. Amer., vol. 3, p. 47.
FOOD PLANTS. *Myrica, Geranium, Acer, etc.*

Choerodes falcata. Packard.
1876. Egg, (brief.) *Packard.* Monogr. Geometr., p. 558.

Tetracis ægrotata. Guen.
1874. Larva, cocoon, pupa. *Hy. Edwards.* Proc. Cal. Acad. Sc., September.
FOOD PLANTS. *Geranium, Rosa, etc.*

Tetracis crocallata. Guen.
1869. Egg, larva. *Minot.* Canad. Entom., vol. 2, p. 28.
1876. Larva. *Packard*, (quotes Minot.) Monogr. Geometr., p. 548.
1879. Larva, pupa. *L. W. Goodell.* Canad. Entom., vol. 12, p 193.
1887. Larva, (brief.) *D. Bruce.* Entom. Amer., vol. 3, p. 47.
FOOD PLANTS. *Castanea, Rhus, etc.*

Tetracis lorata. Grote.
1869. Egg. *Minot.* Canad. Entom., vol. 2, p. 28.
1876. Pupa, (fig.) *Packard.* Monogr. Geometr., pl. 13.
1877. Larva, pupa. *L. W. Goodell.* Canad. Entom., vol. 9, p. 62.
1884. Larva, pupa. *Packard.* Amer. Naturalist, vol. 18, p. 935.
FOOD PLANT. *Comptonia asplenifolia.*

Tetracis trianguliferata. Packard.
1886. Life history. *French.* Canad. Entom., vol. 18, p. 105.
FOOD PLANT. *Ribes aureum.*

Metanema quercivoraria. Guen.
1857. Larva. *Guen.*, (after Abbot's MS. drawing.) Spec. Gener. Phal., vol. 1, p. 172.
1876. Larva. *Packard*, (quotes Guen.) Monogr. Geometr., p. 545.
1881. Larva, (brief.) *Packard.* Ins. Inj. Forest Trees, p. 51.
FOOD PLANT. *Quercus.*

Metanema inatomaria. Guen.
1887. Larva, (brief.) *D. Bruce.* Entom. Amer., vol. 3, p. 47.
FOOD PLANT. *Populus.*

Drepanodes varus. G. and R.
1875. Larva, (fig.) *Packard.* Amer. Naturalist, vol. 9, p. 180.
1876. Larva, pupa, (fig.) *Packard.* Monogr. Geometr., p. 43, pl. 13.
1877. Larva, pupa, (figs.) *Packard.* Half-hours with Insects, p. 270.
1881. Larva, pupa, (figs.) *Packard.* Ins. Inj. Forest Trees, p. 246.
FOOD PLANT. *Juniperus.*

Caberodes confusaria. Hübn.
1876. Larva, pupa, (figs.) *Packard*, (after Abbot's MS. drawing.) Monogr. Geometr, pl. 13.
1857. Larva, (brief.) *D. Bruce.* Entom. Amer., vol. 3, p. 47.
FOOD PLANT. *Trifolium.*

Ennomos alniaria. Linn.
1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths, vol. 2, p. 15.
1859. Larva, (brief.) *Humphreys.* Gener. Brit. Moths, vol. 2, p. 84.
1869. Larva. *Newman.* Brit. Moths, p. 56.
1876. Larva, pupa, (fig.) *Packard*, (quotes Goodell and Scudder in lit.) Monogr. Geometr., p. 530, pl. 13.
1881. Larva, pupa. *Packard.* Ins. Inj. Forest Trees, p. 92.
1882. Larva. *W. F. Kirby.* Europ. Butt. and Moths, p. 299.
1887. Egg, pupa, (brief.) *D. Bruce.* Entom. Amer., vol. 3, p. 47.

1888. Cocoon, (brief.) *M. S. Crane.* Entom. Amer., vol. 4, p. 13.
FOOD PLANTS. *Betula, Alnus, Castanea, etc.*

Ennomos subsignaria. Hübn.
1866. Life history. *Graef—Wiebe.* Rept. Brooklyn Hort. Soc.
1866. Larva. *B. D. Walsh.* Pract. Entom., p. 57.
1868. Larva. *Packard.* Amer. Naturalist, vol. 2, p. 333.
1876. Larva. *Packard.* Monogr. Geometr., p. 528.
1887. Larva. *French.* Trans. Dept. Agr. Ill., vol. 75, p. 224.
1881. Larva. *Packard.* Ins. Inj. Forest Trees, p. 62.
1882. Life history, (brief.) *C. R. Dodge.* Canad. Entom., vol. 14, p. 30.
1882. Life history, (brief.) *C. R. Dodge.* Rept. Entom. Soc. Ontario, p. 18.
1883. Egg, larva, pupa, (figs.) *Saunders.* Ins. Inj. Fruits, p. 112.
FOOD PLANTS. Various trees.

Selenia kentaria. G. and R.
1887. Egg, larva, (brief.) *D. Bruce.* Entom. Amer., vol. 3, p. 47.
FOOD PLANTS. *Betula, Acer, etc.*

Endropia obtusaria. Hübn.
1876. Larva, (fig.) *Packard,* (after Abbot's MS. drawing.) Monogr. Geometr., p. 517, pl. 13.
FOOD PLANT. *Impatiens.*

Endropia pectinaria. W. V.
1876. Larva. *Packard.* Monogr. Geometr., p. 513.
1881. Larva. *Packard,* (after Abbot's MS. drawing.) Ins. Inj. Forest Trees, p. 50.
FOOD PLANTS. *Quercus, etc.*

Endropia bilinearia. Packard.
1881. Larva, (brief.) *Packard.* Ins. Inj. Forest Trees, p. 49.
1887. Larva, (brief.) *D. Bruce.* Entom. Amer., vol. 3, p. 47.
FOOD PLANTS. *Prunus, Quercus, etc.*

Endropia armataria. H. Sch.
1869. Larva. *Fitch.* 13th Rept. Ins. N. York, p. 522.
1871. Larva. *Saunders.* Canad. Entom., vol 3, p. 130.
1871. Larva. *Saunders.* Rept. Entom. Soc. Ontario, p. 378.
1872. Larva. *T. Glover.* Rept. Entom. Trans. N. York State Agr. Soc., p. 83.
1883. Larva, pupa. *Saunders.* Ins. Inj. Fruits, p. 354.
FOOD PLANT. *Ribes.*

Endropia textrinaria. G. and R.
1869. Larva, pupa, (fig.) *Packard,* (after Abbot's MS. drawing.) Monogr. Geometr., p. 508, pl. 13.
1884. Larva, pupa. *Packard.* Amer. Naturalist, vol. 18, p. 934.
FOOD PLANT. *Quercus.*

Metrocampa margaritata. Linn.
1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths, vol. 2, p. 10.
1859. Larva, (brief.) *Humphreys.* Gener. Brit. Moths, p. 86.
1869. Larva. *Newman.* Brit. Moths, p. 53.
1882. Larva. *W. F. Kirby.* Europ. Butt. and Moths, p. 298.
FOOD PLANTS. *Quercus, Betula, Fagus, etc.*

Therina fervidaria. Hübn.
1876. Larva, pupa, (fig.) *Packard,* (after Abbot's MS. drawing.) Monogr. Geometr., p. 494, pl. 13.
1886. Larva, pupa. *Packard.* Rept. Entom. U. S. Dept. Agr., p. 329.
FOOD PLANT. *Halesia diptera.*

Therina endropiaria. G. and R.
1879. Larva. *L. W. Goodell.* Canad. Entom., vol. 11, p. 194.
FOOD PLANT. *Quercus.*

Therina seminudaria. Walker.

1886. Pupa. *Packard.* Rept. Entom. U. S. Dept. Agr., p. 329.

Anagoga pulveraria. Linn.

1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths, vol. 2, p. 59.
1869. Larva. *Merryfield.* Newman's Brit. Moths, p. 90.
1876. Larva, pupa. *Packard,* (quotes Merryfield and L. W. Goodell in lit.) Monogr. Geometr., 488.

FOOD PLANT. *Salix.*

Angerona crocataria. Fabr.

1869. Larva. *Packard.* Guide to Study of Ins., p. 319.
1871. Egg, larva, pupa. *G. J. Bowles.* Canad. Entom., vol. 3, p. 9.
1871. Larva, (fig.) *Saunders.* Rept. Entom. Soc. Ontario, p. 377.
1876. Larva, (fig.) *Packard.* Monogr. Geometr., p. 475, pl. 13.
1877. Larva. *French,* (quotes Packard.) Trans. Dept. Agr. Ill., vol. 15, p. 273.
1883. Larva, pupa. *S. A. Forbes.* Trans. Wisconsin Agr. Soc., vol. 31, p. 6.
1883. Larva, pupa, (figs.) *Saunders.* Ins. Inj. Fruits, p. 348.

FOOD PLANTS. *Ribes, Fragaria, etc.*

Nematocampa filamentaria. Guen.

1869. Larva, (fig.) *Harris.* Entom. Corres., p. 322, pl. 3.
1876. Larva, pupa, (fig.) *Packard.* Monogr. Geometr., p. 471, pl. 13.
1877. Larva. *French,* (quotes Packard.) Trans. Dept. Agr. Ill., vol. 15, p. 242.
1880. Larva. *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 149.
1883. Larva, cocoon, pupa, (figs.) *Saunders.* Ins. Inj. Fruits, p. 167.
1883. Larva. *S. A. Forbes.* Trans. Wisconsin Agr. Soc., vol. 13, p. 5.

FOOD PLANTS. *Ribes, Fragaria, etc.*

Hyperetis nyssaria. Guen. = **amicaria.** H. Sch.

1876. Larva. *Saunders.* Canad. Entom., vol. 3, p. 209.
1876. Larva, pupa, (figs.) *Packard,* (after Abbot's MS. drawings.) Monogr. Geomtr., p. 464, pl. 13.
1881. Larva. *Packard,* (quotes Saunders.) Ins. Inj. Forest Trees, p. 129.

FOOD PLANTS. *Fagus, Hypericum.*

Aplodes rubrolinearia. Pack.

1887. Larva. *Hulst.* Entom. Amer., vol. 3, p. 72.

FOOD PLANT. *Myrica cerifera.*

Aplodes mimosaria. Guen.

1864. Larva, pupa, (brief.) *B. D. Walsh.* Proc. Boston Soc. N. Hist., vol. 9, p. 301.
1876. Larva, pupa. *Packard,* (quotes Walsh.) Monogr. Geometr., p. 389.
1881. Larva. *Packard.* Ins. Inj. Forest Trees, p. 49.

FOOD PLANT. *Quercus.*

Aplodes packardaria. Grote.

1876. Larva, pupa. *Packard,* (as A. rubrifrontalis.) Monog. Geometr., p. 387.

FOOD PLANT. *Comptonia asplenifolia.*

Aplodes brunnearia. Pack.

1876. Larva, pupa, (fig.) *Packard,* (after Abbot's MS. drawing.) Monogr. Geometr., p. 388, pl. 13.

FOOD PLANT. *Juglans nigra.*

Aplodes coniferaria. Pack.

1884. Larva, pupa. *Packard.* Amer. Naturalist, vol. 18, p. 933.

FOOD PLANT. *Abies.*

Synchlora rubivora. Riley.

1869. Larva, (fig.) *Riley.* 1st Missouri Rept., p. 139.
1873. Larva, (fig.) *Saunders.* Rept. Entom. Soc. Ontario, p. 16.
1876. Larva. *Packard,* (quotes Riley.) Monogr. Geometr., p. 382.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 238.

1883. Larva, pupa, (figs.) *Saunders.* Ins. Inj. Fruits, p. 316.
FOOD PLANT. *Rubus.*

Synchlora excurvaria. Packard.
1876. Larva, (fig.) *Packard,* (after Abbot's MS. drawing.) Monogr. Geometr., pl. 13.

Chlorosea bistriaria. Packard.
1888. Larva. *Hulst.* Entom. Amer., vol. 3, p. 193.
FOOD PLANT. *Solidago.*

Eucrostis chloroleucaria. Guen.
1879. Larva, pupa. *Hulst.* Bull. Brooklyn Entom. Soc., vol. 2, p. 78.
1880. Larva, pupa. *L. W. Goodell.* Canad. Entom., vol. 12, p. 235.
FOOD PLANTS. *Leucanthemum vulgare, Helianthus, etc.*

Dysteris abortivaria. H. Sch.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 238.
FOOD PLANT. *Vitis.*

Ephyra pendulinaria. Guen.
1876. Larva, pupa, (fig.) *Packard,* (quotes Scudder in MS.) Monogr. Geometr., p. 363, pl. 13.
FOOD PLANT. *Comptonia asplenioides.*

Ephyra myrtaria. Guen.
1877. Larva, pupa. *L. W. Goodell.* Canad. Entom., vol. 9, p. 62.
FOOD PLANTS. *Comptonia, Gaylussacia.*

Arrhostia lumenaria. Hübn.
1876. Larva, pupa, (fig.) *Packard,* (after Abbot's MS. drawing.) Monogr. Geometr., p. 365, pl. 13.
FOOD PLANT. *Psoralea.*

Acidalia insularia. Guen.
1876. Pupa, (fig.) *Packard.* Monogr. Geometr., p. 336, pl. 13.
1887. Larva, pupa. *Hulst.* Entom. Amer., vol. 3, p. 175.
FOOD PLANT. *Cassia chamæcrista.*

Acidalia enucleata. Guen.
1857. Larva, pupa, (fig.) *Guen.* Spec. Gener. Phal., pl. 12.
1876. Larva, pupa, (figs.) *Packard,* (quotes Guen.) Monogr. Geometr., p. 348, pl. 13.
1879. Larva, cocoon. *L. W. Goodell.* Canad. Entom., vol. 11, p. 194.
1880. Egg, young larva. *L. W. Goodell.* Canad. Entom., vol. 12, p. 235.
FOOD PLANT. *Rhexia lutea.*

Acidalia ordinata. Walk.
1876. Larva, pupa, (figs.) *Packard,* (after Abbot's MS. drawing.) Monogr. Geometr., p. 565, pl. 13.
FOOD PLANT. *Trillium stylosum.*

Stegania pustularia. Guen.
1871. Larva. *Saunders.* Canad. Entom., vol. 3, p. 225.
1876. Larva, pupa, (figs.) *Packard,* (after Abbot's MS. drawing.) Monogr. Geometr., p. 310, pl. 13, (quotes Saunders.)
1881. Larva. *Packard,* (quotes Saunders.) Ins. Inj. Forest Trees, p. 112.
FOOD PLANT. *Acer.*

Eumacaria brunnearia. Packard.
1878. Larva. *L. W. Goodell.* Canad. Entom., vol. 10, p. 66.
1885. Larva, pupa. *D. Kellicott.* Canad. Entom., vol. 17, p. 32.
FOOD PLANT. *Prunus.*

Semiothisa præatomata. Haworth.
1857. Larva. *Guen.* Spec. Gener. Phal., vol. 2, p. 76.
1876. Larva. *Packard,* (quotes Guen.) Monogr. Geometr., p. 293.
FOOD PLANT. *Vaccinium.*

Semiothsia enotata. Guen.

1876. Larva, pupa, (figs.) *Packard*, (from Abbot's MS. drawing.) Monogr. Geometr., p. 564, pl. 13.

FOOD PLANT. *Lactuca grandifolia.*

Thamnonoma travaria. Linn.

1829. Larva. *Stephens.* Ill. Brit. Entom., Haust., vol. 3, p. 194.
1857. Larva. *Guen.* Spec. Gener. Phal., vol. 2, p. 93.
1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths, vol. 2, p. 56.
1859. Larva, (col'd fig.) *Humphreys.* Gen. Brit. Moths, pl. 31.
1870. Larva. *Packard*, (quotes Guen.) Inj. Ins. (new or little known), p. 12.
1882. Larva. *W. F. Kirby.* Europ. Butt. and Moths, p. 318.

FOOD PLANT. *Ribes.*

Thamnonoma brunneata. Thunb.

1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths, vol. 2, p. 62.

FOOD PLANT. *Vaccinium.*

Eufitchia ribearia. Fitch.

1856. Larva. *Fitch.* 3d Rept. Ins. N. York, p. 427.
1865. Larva. *B. D. Walsh.* Practical Entom., p. 22.
1869. Larva. *Harris.* Entom. Corres., p. 320.
1871. Larva, pupa, (fig.) *Saunders.* Rept. Entom. Soc. Ontario, p. 374.
1873. Larva, pupa, (fig.) *A. J. Cook.* 12th Rept. Michigan Agr. Soc., p. 143.
1874. Egg, larva, pupa, (figs.) *Saunders.* Rept. Entom. Soc. Ontario, p. 19.
1874. Larva. *Saunders.* Canad. Entom., vol. 6, p. 138.
1875. Larva, pupa, (figs.) *Saunders.* Rept. Entom. Soc. Ontario, p. 33.
1876. Larva, (fig.) *Packard.* Monogr. Geometr., p. 248, pl. 13.
1877. Larva, pupa, (figs.) *Packard.* Ins. Inj. West, Hayden's Rept., p. 191.
1877. Lava, pupa. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 237.
1877. Larva, (fig.) *Packard.* Half-hours with Insects, p. 51.
1877. Egg, larva, pupa, (fig.) *Riley.* 9th Missouri Rept., p. 3.
1878. Larva, pupa, (fig.) *G. H. Perkins.* 5th Rept. Vermont Board Agr., p. 263.
1882. Larva, pupa, (fig.) *Bethune.* 12th Rept. Entom. Soc. Ontario, p. 83.
1883. Larva, pupa, (fig.) *T. J. Edge.* Agr. Pennsylv., p. 74.
1883. Egg, larva, pupa, (fig.) *Saunders.* Ins. Inj. Fruits, p. 345.
1888. Larva, pupa, (figs.) *Bethune.* 18th Rept. Entom. Soc. Ontario, p. 56.

FOOD PLANT. *Ribes.*

Caripeta angustiorata. Walker.

1884. Larva, pupa. *Packard.* Amer. Naturalist, vol. 18, p. 1045.

FOOD PLANT. *Pinus.*

Fidonia notataria. Walker.

1882. Life history. *L. W. Goodell.* Canad. Entom., vol. 14, p. 199.

FOOD PLANT. *Pinus strobus.*

Hæmatopis grataria. Fabr.

1859. Life history, (figs.) *Riley.* 1st Missouri Rept., p. 179.
1876. Larva, pupa. *Packard*, (quotes Riley.) Monogr. Geometr., p. 219.

FOOD PLANT. *Stellaria.*

Caterva catenaria. Drury.

1852. Cocoon. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 358.
1862. Larva, cocoon, pupa, (figs.) *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 46.
1869. Larva, pupa. *Harris.* Entom. Corres., p. 321.
1876. Larva, pupa, (fig.) *Packard.* Monogr. Geometr., p. 218, pl. 13.
1881. Larva. *Coquillett.* Papilio, vol. 1, p. 56.

FOOD PLANTS. Various shrubs and trees.

Tornos rubiginosaria. Morrison.

1876. Larva, pupa, (figs.) *Packard*, (after Abbot's MS. drawings.) Monogr. Geometr., p. 564, pl. 13.

FOOD PLANT. *Coreopsis.*

Aspilates dissimilaria. Hübn.

1857. Larva, pupa. *Guen.* Spec. Gener. Phal., vol. 2, p. 182.
1876. Larva, pupa. *Packard,* (quotes Guen.) Monogr. Geometr., p. 209.
1876. Larva, pupa, (figs.) *Packard,* (after Abbot's MS. drawings.) Monogr. Geometr., pl. 13.

FOOD PLANT. *Trifolium.*

Euaspilates spinataria. Pack.

1887. Larva, (brief.) *D. Bruce.* Entom. Amer., vol. 3, p. 49.

Cleora pulchraria. Minot.

1870. Larva, pupa. *Packard.* Inj. Ins. (new or little known), p. 14.
1876. Larva, pupa, (figs.) *Packard.* Monogr. Geometr., p. 453, pl. 13.
1881. Larva, pupa. *Packard,* (quotes Saunders in lit.) Ins. Inj. Forest Trees, p. 205.
1886. Larva, pupa. *Packard.* Rept. Entom. Dept. Agr., p. 328.

FOOD PLANT. *Pinus.*

Stenotrachelys approximaria. Hübn.

1857. Larva. *Guen.,* (after Abbott's MS. drawing.) Spec. Gener. Phal., vol. 1, p. 290.
1876. Larva. *Packard,* (quotes Guen.) Monogr. Geometr., p. 449.
1881. Larva. *Packard.* Ins. Inj. Forest Trees, p. 49.

FOOD PLANTS. *Smilax, Quercus, etc.*

Epimecis hortaria. Fab.

1797. Larva, (col'd fig.) *Abbot—Smith,* (as Ph. liriodendraria.) Lep. Ins. Georgia, p. 203, pl. 102
1876. Larva. *Packard,* (after Abbot's MS. drawing.) Monogr. Geometr., p. 445.

FOOD PLANT. *Liriodendron tulipifera.*

Ceratonyx satanaria. Guen.

1853. Larva, (col'd fig.) *Guen.* Spec. Gener. Phal., vol. 1, p. 194, pl. 2.
1876. Larva. *Packard,* (quotes Guen.) Monogr. Geometr., p. 565.

FOOD PLANTS. *Liquidambar, Quercus.*

Cymatophora larvaria. Guen.

1874. Larva. *Saunders.* Canad. Entom., vol. 6, p. 34.
1876. Larva, pupa, (fig.) *Packard.* Monogr. Geometr., p. 438, pl. 13.

FOOD PLANT. *Prunus.*

Cymatophora pampinaria. Guen.

1876. Larva, pupa. *Packard,* (quotes L. W. Goodell in lit.) Monogr. Geometr., p. 435.
1881. Larva. *French.* Papilio, vol. 1, p. 82.

FOOD PLANT. *Pyrus.*

Cymatophora humaria. Guen.

1876. Larva, pupa, (fig.) *Packard,* (after Abbot's MS. drawing.) Monogr. Geometr., p. 437, pl. 13.

Cymatophora crepuscularia. Tr.

1851. Larva, pupa. *Guen.* Spec. Gener. Phal., vol. 1, p. 260.
1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths., vol. 2, p. 28.
1876. Larva. *Packard,* (quotes Guen.) Monogr. Geometr., p. 425.
1878. Larva. *L. W. Goodell.* Canad. Entom., vol. 10, p. 67.

FOOD PLANTS. *Salix, Populus, Alnus, etc.*

Paraphia subatomaria. Guen.

1876. Larva, (brief.) *Packard,* (quotes Saunders in lit.) Monogr. Geometr., p. 418.
1881. Larva, (brief.) *Packard.* Ins. Inj. Forest Trees, p. 205.

FOOD PLANT. *Pinus.*

Paraphia unipunctaria. Haworth.

1857. Larva, pupa, (brief.) *Guen.,* (from Abbot's MS. drawing.) Spec. Gener. Phal., vol. 2, p. 62.

[illegible] **minervata**, Grote.

[illegible] Larva, pupa, (figs.). Packard. Monogr. Geometr., p. 56, pl. 23.

[illegible] Larva, pupa. Packard. Ann. Lyc. Nat. Hist. New York, p. 328.

[illegible] Habits. Juniperus.

[illegible] **interruptolineata**, Packard.

[illegible] Larva. Gosselet. Papilio, vol. I, p. 56.

[illegible] Larva, pupa. Saunders. Can. Ent., p. 252.

[illegible] Habits, etc.

[illegible] **[illegible]**, Peck.

[illegible] Dalfinger on Ct. Monogr. Geometr., p. 52.

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[illegible], Abb.

[illegible] Trans. Amer. Ent. Soc., vol. 2, p. 69.

[illegible] Trans. Maine, p. 316.

[illegible] Monogr. Geometr., p. 50, pl. 13.

[illegible] Can. Entom., vol. 5, p. 42.

[illegible] Trans. Me. Nat. Hist., p. 346.

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1850. Larva. *Harris.* N. Engl'd Farmer, ser. 2, vol. 2, p. 252.
1851. Larva. *Harris.* Massachusetts Ploughman, vol. 10, Nos. 8, 33.
1852. Larva. *Harris.* N. Engl'd Farmer, ser. 4, vol. 4, p. 155.
1852. Life history. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 359.
1854. Larva *Harris.* N. Engl'd Farmer, ser. 8, vol. 6, p. 363.
1856. Larva. *Fitch.* 3d Rept. Ins. N. York, p. 342.
1862. Life history, (figs.) *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 462.
1862. Larva, (fig.) *Packard.* 7th Rept. Maine Board Agr., p. 173.
1864. Larva. *Jaeger.* Life N. Amer. Ins., p. 175.
1867. Larva. *Tenney.* Nat. Hist., p. 407.
1869. Larva, (fig.) *Packard.* Guide to Study of Ins., p. 324, pl. 8.
1870. Egg, larva. *T. Glover.* Rept. U. S. Dept. Agr., p. 85.
1870. Life history, (figs.) *Riley.* 2d Missouri Rept., p. 94.
1872. Life history, (figs.) *Le Baron,* (after Riley.) 3d Illinois Rept.
1873. Egg, larva, (figs.) *A. J. Cook.* 12th Rept. Michigan Board Agric., p. 129.
1875. Egg, larva, (figs.) *Riley.* 7th Missouri Rept., p. 80.
1875. Egg, larval stages, pupa, (figs.) *Saunders.* Rept. Entom. Soc. Ontario, p. 25.
1876. Egg, larva, pupa. *Packard,* (quotes Peck.) Monogr. Geometr., p. 403.
1876. Larva, pupa, (figs.) *Packard.* Monogr. Geometr., p. 405, pl. 13.
1876. Larva, pupa. *G. H. Perkins.* 2d Rept. Vermont Board Agric., p. 591.
1876. Life history. *C. Thomas.* Trans. Dept. Agr. Ill., vol. 14, p. 16.
1877. Egg, larva, pupa, (figs.) *C. Thomas.* Trans. Dept. Agr. Ill., vol. 15, p. 110.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 237.
1877. Larva, pupa, (figs.) *Packard.* Inj. Ins. West, Hayden's Rept., p. 791.
1877. Egg, larva. *Packard.* Half-hours with Insects, p. 173.
1881. Egg, larva, (figs.) *Packard,* (after Riley.) Ins. Inj. Forest Trees, p. 61.
1882. Life history, (figs.) *Riley.* 3d Rept. U. S. Entom. Comm., p. 157.
1882. Life history, (brief.) *Bethune,* (quotes Saunders.) 12th Rept. Entom. Soc. Ontario, p. 84.
1883. Life history, brief, (figs.) *Saunders.* Ins. Inj. Fruits, p. 67.
1885. Egg, larva, (figs.) *J. Fletcher.* Rept. Entom. Dept. Agr. Ontario, p. 23.
1885. Larva. *Fernald.* Kingsley's Stand. N. Hist., vol. 2, p. 446.

FOOD PLANTS. *Ulmus, Pyrus,* and many other trees.

Anisopteryx autumnata. Packard. = **pometaria.** Mann.

1841. Larva. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 333.
1875. Egg, larva, (figs.) *Riley.* 7th Missouri Rept., p. 83.
1875. Egg, larva, pupa, (figs.) *Saunders.* Rept. Entom. Soc. Ontario, p. 26.
1876. Egg, larva, pupa, (figs.) *Packard.* Monogr. Geometr., p. 401, pl. 13.
1876. Larva, (brief.) *G. H. Perkins.* Rept. Vermont Board Agr., p. 595.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 239.
1877. Egg, larva, pupa, (figs.) *Packard.* Inj. Ins. West, Hayden's Rept., p. 793.
1880. Egg, larva, pupa, (figs.) *Coquillett,* (quotes French.) Trans. Dept. Agr. Ill., vol. 18, Append., p. 148.
1880. Life history, (figs.) *Riley.* 3d Rept. U. S. Entom. Comm., p. 157.
1883. Egg, larva, pupa, (figs.) *Saunders.* Ins. Inj. Fruits, p. 65.
1885. Egg, larva, (figs.) *J. Fletcher.* Rept. Entom. Dept. Agr. Ontario, p. 23.
1885. Egg, larva. *Fernald.* Kingsley's Stand. N. Hist., vol. 2, p. 446.

FOOD PLANTS. *Pyrus, Ulmus,* and other trees.

Heterophleps triguttata. H. Sch.

1878. Larva. *Packard,* (quotes Saunders in lit.) Monogr. Geometr., p. 194.

FOOD PLANT. *Acer.*

Hydria undulata. Linn.

1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths, vol. 2, p. 110.
1859. Larva, (brief.) *Humphreys.* Genera Brit. Moths, p. 111.
1869. Life history. *Beauchamp.* Newman's Brit. Moths, p. 179.

1870. Life history. *Fitch.* 14th Rept. Ins. N. York, p. 355.
1876. Larva. *Packard,* (quotes Beauchamp.) Monogr. Geometr., p. 173.
1882. Larva. *W. F. Kirby.* Europ. Butt. and Moths, p. 378.
FOOD PLANTS. *Prunus, Salix, etc.*

Rheumaptera fluctuata. Linn.
1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths, vol. 2, p. 102.
1869. Larva. *Newman.* Brit. Moths, p. 164.
1876. Larva. *Packard,* (quotes Newman.) Monogr. Geometr., p. 157.
1882. Larva. *W. F. Kirby.* Europ. Butt. and Moths, p. 378.
FOOD PLANTS. *Cruciferæ.*

Rheumaptera unangulata. Haworth.
1869. Larva. *Newman.* Brit. Moths, p. 159.
1876. Larva. *Packard,* (quotes Newman.) Monogr. Geometr., p. 160.
FOOD PLANT. *Alsine media.*

Rheumaptera tristata. Linn.
1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths, vol. 2, p. 100.
1859. Larva, (col'd fig.) *Humphreys.* Genera Brit. Moths, pl. 43.
1869. Larva. *Newman.* Brit. Moths, p. 157.
1876. Larva. *Packard,* (quotes Newman's Brit. Moths.) Monogr. Geometr., p. 163.
1882. Larva. *W. F. Kirby.* Europ. Butt. and Moths, p. 380.
FOOD PLANT. *Galium.*

Rheumaptera hastata. Linn.
1829. Larva. *Stephens.* Illus. Brit. Entom., Haust., vol. 3, p. 249.
1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths, vol. 2, p. 100.
1859. Larva, (col'd fig.) *Humphreys.* Genera Brit. Moths, pl. 43.
1860. Larva, (brief.) *Duncan.* Natural. Library, vol. 30, p. 256.
1869. Larva. *Newman.* Brit. Moths, p. 157.
1872. Larva. *J. G. Wood.* Insects at Home, p. 458.
1876. Larva. *Packard,* (quotes Newman.) Monogr. Geometr., p. 165.
1882. Larva. *W. F. Kirby.* Europ. Butt. and Moths, p. 380.
1885. Larva, (fig.) *Fernald.* Kingsley's Stand. N. Hist., vol. 2, p. 447.
FOOD PLANTS. *Betula, Myrica.*

Ochyria ferrugata. Linn.
1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths, vol. 2, p. 105.
1869. Larva. *Newman.* Brit. Moths, p. 168.
1876. Larva. *Packard,* (quotes Newman.) Monogr. Geometr., p. 148.
FOOD PLANTS. *Alsine, Glechoma, etc.*

Ochyria munitata. Hübn.
1869. Larva. *Newman.* Brit. Moths, p. 168.
1876. Larva. *Packard,* (quotes Newman's Brit. Moths.) Monogr. Geometr., p. 138.
1882. Larva. *W. F. Kirby.* Europ. Butt. and Moths, p. 376.
FOOD PLANT. *Senecio.*

Ochyria designata. Hübn.
1855. Larva, (col'd fig.) *Sepp.* Dutch Lepidoptera.
1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths.
1869. Larva. *Newman,* (quotes Sepp.) Brit. Moths, p. 168.
1876. Larva. *Packard,* (quotes Sepp and Stainton.) Monogr. Geometr., p. 146.
1880. Larva, pupa. *L. W. Goodell.* Canad. Entom., vol. 12, p. 235.
1882. Larva. *W. F. Kirby.* Europ. Butt. and Moths, p. 376
FOOD PLANTS. *Brassica, Alyssum.*

Petrophora diversilineata. Hübn.
1870. Larva. *Saunders.* Canad. Entom., vol. 2, pp. 74, 128.
1876. Egg, larva, pupa. *Packard.* Monogr. Geometr., p. 128.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 237.
1883. Larva, pupa, (fig.) *Saunders.* Ins. Inj. Fruits, p. 271.
1887. Larva, (brief.) *D. Bruce.* Entom. Amer., vol. 3, p. 50.

1887. Larva, (fig.) *J. Fletcher.* Rept. Entom. Dept. Agr. Canad., p. 30.
1888. Larva, (fig.) *J. Fletcher.* Rept. Entom. Bot. Dept. Agr. Canada, p. 30.
FOOD PLANTS. *Vitis, Ampelopsis, etc.*

Petrophora testata. Linn.
1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths, vol. 2, p. 114.
1869. Larva. *Newman.* Brit. Moths, p. 191.
1876. Larva. *Packard,* (quotes Newman.) Monogr. Geometr., p. 123.
1882. Larva. *W. F. Kirby.* Europ. Butt. and Moths, p. 370.
FOOD PLANTS. *Populus, Salix, Betula.*

Petrophora prunata. Linn.
1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths, vol. 2, p. 114.
1859. Larva, pupa, (col'd figs.) *Humphreys.* Genera Brit. Moths, pl. 40.
1882. Larva. *W. F. Kirby.* Europ. Butt. and Moths, p. 370.
FOOD PLANT. *Ribes.*

Petrophora truncata. Hübn.
1869. Life history. *Newman.* Brit. Moths, p. 186.
1876. Life history, (fig.) *Packard,* (quotes Newman.) Monogr. Geometr., p. 109, pl. 13.
FOOD PLANT. *Fragaria.*

Hydriomena sordidata. Fabr.
1869. Life history. *Newman.* Brit. Moths, p. 153.
1876. Larva, (fig.) *Packard,* (quotes Newman.) Monogr. Geometr., p. 99, pl. 13.
1882. Larva. *W. F. Kirby.* Europ. Butt. and Moths, p. 381.
FOOD PLANT. *Salix.*

Thera contractata. Packard.
1885. Larva, pupa. *Packard.* Bulletin No. 12, Dept. Agr., p. 22.
FOOD PLANTS. *Pinus, Abies, Juniperus.*

Epirrita dilutata. Bork.
1858. Larva. *Fitch.* 5th Rept. Ins. N. York, p. 842.
1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths, vol. 2, p. 77.
1869. Larva. *Newman.* Brit. Moths, p. 109.
1876. Larva, (fig.) *Packard,* (quotes Newman.) Monogr. Geometr., p. 88, pl. 13.
1881. Larva. *Packard.* Ins. Inj. Forest Trees, p. 63.
FOOD PLANTS. *Prunus, Quercus, Ulmus, etc.*

Epirrita cambricaria. Curtis.
1869. Larva. *Newman.* Brit. Moths, p. 76.
1876. Larva. *Packard,* (quotes Newman.) Monogr. Geometr., p. 86.
FOOD PLANT. *Pyrus aucuparia.*

Plemyria fluviata. Hübn.
1858. Life history. (*Anonymous.*) Entomologist's Intelligencer.
1868. Life history, (figs.) *Milliere.* Ann. Linn. Soc. Lyons, p. 50, pl. 90.
1869. Life history. *Newman.* British Moths.
1876. Life history, (figs.) *Packard,* (quotes Newman.) Monogr. Geometr., p. 78, pl. 13.
1876. Life history. *Packard,* (quotes Milliere.) Monogr. Geometr., p. 564.
FOOD PLANTS. *Anthemis, Chrysanthemum.*

Glaucopteryx cæsiata. Borth.
1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths, vol. 2, p. 78.
1869. Life history. *Newman.* Brit. Moths, p. 110.
1876. Life history, (fig.) *Packard,* (quotes Newman.) Monogr. Geometr., p. 69. pl. 13.
1882. Larva. *W. F. Kirby.* Europ. Butt. and Moths, p. 383.
FOOD PLANTS. *Ericaceæ.*

Glaucopteryx magnoliata. Packard. = **cumatilis.** G. and R.
1875. Larva, pupa. *Hy. Edwards.* Proc. Cal. Acad. Sc., April.
FOOD PLANTS. *Fuschia, Geranium, etc.*

Eupithecia miserulata. Grote.

1876. Larva, pupa, (figs.) *Packard.* Monogr. Geometr., p. 54, pl. 13.
1881. Larva, pupa. *Packard.* Ins. Inj. Forest Trees, p. 248.
FOOD PLANT. *Juniperus.*

Eupithecia interruptofasciata. Packard.

1881. Larva. *Coquillett.* Papilio, vol. 1, p. 56.
1883. Larva, pupa. *Saunders.* Ins. Inj. Fruits, p. 352.
FOOD PLANTS. *Trifolium, etc.*

Eupithecia zygadeniata. Pack.

1876. Larva. *Packard,* (quotes Belfrage in lit.) Monogr. Geometr., p. 52.
FOOD PLANT. *Zygadenus nuttallii.*

Eupithecia absynthiata. Linn.

1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths, vol. 2, p. 69.
1869. Larva. *Crewe.* Newman's Brit. Moths, p. 136.
1876. Larva, (fig.) *Packard,* (quotes Crewe.) Monogr. Geometr., p. 50, pl. 13.
1877. Larva, pupa. *L. W. Goodell.* Canad. Entom , vol. 9, p. 62.
1882. Larva. *W. F. Kirby.* Europ. Butt. and Moths, p. 403.
FOOD PLANTS. Various species of *Compositæ.*

Exelis pyrolaria. Guen.

1857. Larva. *Guen.* Spec. Gener., vol. 1, p. 324.
1876. Larva. *Packard,* (quotes Guen.) Monogr. Geometr., p. 565.
FOOD PLANT. *Pyrola.*

PYRALIDÆ.

Omphalocera cariosa. Lederer.

1880. Larva, cocoon. *French,* (as amphaloma.) 6th Rept. Ill. State Norm. Univer., p. 46.
FOOD PLANT. *Anoma triloba.*

Asopia farinalis. Linn.

1841. Larva. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 343.
1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths, vol. 2, p. 134.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 247.
1880. Larva. *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 157.
1882. Larva. *W. F. Kirby.* Europ. Butt. and Moths, p. 410.
1885. Larva. *Fernald.* Kingsley's Stand. N. Hist., vol. 2, p. 444.
FEEDS on corn, meal, etc.

Asopia costalis. Fabr.

1870. Larva, pupa, (figs.) *T. Glover.* Rept. U. S. Dept. Agr , p. 84.
1874. Life history, (figs) *Riley.* 6th Missouri Rept., p. 102.
1877. Larva. *French,* (quotes Riley.) Trans. Dept. Agr. Ill., vol. 15, p. 247.
1882. Larva, pupa, (figs.) *Saunders.* 12th Rept. Entom. Soc. Ontario, p. 45.
FEEDS on dry clover. *Trifolium.*

Botis inæqualis. Guen.

1883. Larva. *Coquillett.* Papilio, vol. 3, p. 102.
FOOD PLANT. *Circium lanceolatum.*

Botis generosa. G. and R.

1883. Larva. *Coquillett.* Papilio, vol. 3, p. 101.
FOOD PLANT. *Monarda fistulosa.*

Botis tertialis. Guen.

1854. Larva. *Guen.,* (after Abbot's MS. drawing.) Spec. General. Delt. Pyral., vol. 8, p. 364.
FOOD PLANT. *Vaccinium.*

Botis erectalis. Grote.

Larva. *W. Beutenmüller.* Canad. Entom., vol. 20, p. 15.
Apocynum.

Botis penitalis. Grote.

1880. Larva. *Coquillett.* Canad. Entom., vol. 12, p. 45.
1880. Larva. *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 154.
FOOD PLANT. *Apocynum.*

Botis magistralis. Grote.

1888. Larva. *W. Beutenmüller.* Canad. Entom., vol. 20, p. 15.
FOOD PLANT. *Clethra alnifolia.*

Botis oscitalis. Grote.

1883. Larva. *Coquillett.* Papilio, vol. 3, p. 101.
FOOD PLANTS. *Salix, Populus.*

Botis syringicola. Packard.

1870. Larva, (brief.) *Packard.* Inj. Ins., new or little known, p. 18.
FEEDS in stems of *Syringa.*

Agathodes designalis. Guen.

1854. Larva. *Guen.*, (after Abbot's MS. drawing.) Spec. Gener. Delt. Pyr., vol. 8, p. 209.
FOOD PLANTS. *Asclepias, Salix.*

Eurycreon rantalis. Guen.

1882. Larva, (brief.) *Lintner.* 41st Rept. N. York State Agr. Soc., p. 49.
1885. Larva, pupa, (figs.) *Riley.* Rept. U. S. Dept. Agr., p. 265, pl. 4, fig. 3.
FOOD PLANTS. *Amaranthus, Ambrosia,* and various cult. crops.

Mesographe rimosalis. Guen.

1879. Larva. *C. Thomas.* Trans. Dept. Agr. Ill., vol. 17, Append., p. 38.
1880. Larva, cocoon. *C. Thomas.* Amer. Entom., vol. 1, 2d series, p. 22.
FOOD PLANT. *Brassica.*

Mesographe stramentalis. Hübn.

1869. Larva, (fig.) *Harris,* (as B. sumalis.) Entom. Corres., p. 322.
1872. Larva. *Lintner.* 26th Rept. N. York State Cab. N. Hist., p. 164.
1885. Larva. *Fernald.* Kingsley's Stand. N. Hist., vol. 2, p. 445.
FOOD PLANT. *Cochlearia armoracia,* (Horse-radish.)

Pantographa limata. G. and R.

1884. Larva. *Fernald.* Canad. Entom., vol. 16, p. 27.
1885. Larva. *Fernald.* Kingsley's Stand. N. Hist., vol. 2, p. 445.
FOOD PLANT. *Tilia americana.*

Eudioptis hyalinata. Linn.

1832. Larva, pupa, (col'd figs.) *Poey.* Lep. Cubana, pl. 19.
1854. Larva. *Guen.* Spec. Gener. Delt. Pyral., vol, 8, p. 296.
1875. Larva, pupa, (figs.) *C. R. Dodge.* Field and Forest, vol. 1, p. 9.
1880. Life history. *J. E. Willett.* Rept. Entom. Dept. Agr., p. 219.
1880. Life history. *J. H. Comstock,* (quotes Willet.) Loc cit., p. 218.
1883. Larva, pupa, (figs.) *Saunders.* Canad. Entom., vol. 15, p. 56.
1883. Larva, pupa, (figs.) *Saunders.* Rept. Entom. Soc. Ontario, p. 24.
1883. Life history, (brief.) *Saunders.* Ins. Inj. Fruits, p. 365.
1883. Larva, (fig.) *T. J. Edge.* Agr. Pennsylv., p. 67.
1885. Larva. *Fernald.* Kingsley's Stand. N. Hist., vol. 2, p. 444.
FEEDS on fruits of *Cucurbitaceæ.*

Eudioptis nitidalis. Cramer.

1854. Larva. *Guen.* Spec. Gener. Delt. Pyral., vol. 8, p. 300.
1870. Life history, (figs.) *Riley.* 2d Missouri Rept., p. 67.
1870. Larva, pupa, (figs.) *T. Glover.* Rept. Dept. Agr., p. 84.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 251.
1877. Larva, pupa, (figs.) *Packard,* (after Riley.) Inj. Ins. West, Hayden's Rept., p. 772.
1883. Larva, pupa. *Saunders.* Ins. Inj. Fruits, p. 368.
1883. Larva, (fig.) *T. J. Edge,* (after Riley.) Agr. Pennsylv., p. 65.

1885. Larva, (fig.) *Fernald.* Kingsley's Stand. N. Hist., vol. 2, p. 444.
FEEDS on fruits of *Cucurbitaceæ.*

Desmia maculalis. Westwood.
1856. Larva. *Fitch.* 3d Rept. Ins. N. York, p. 401.
1871. Life history, (figs.) *Riley.* 3d Missouri Rept., p. 61.
1871. Larva, pupa, (fig.) *Saunders.* Rept. Entom. Soc. Ontario, p. 358.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 249.
1878. Larva, pupa, (fig.) *G. H. Perkins.* 5th Rept. Vermont Board Agr., p. 277.
1881. Larva. *W. W. Goldsmith.* Rept. Kentucky Bureau Agr., p. 251.
1883. Egg, larva, pupa, (figs.) *Saunders.* Ins. Inj. Fruits, p. 267.
FOOD PLANT. *Vitis.*

Zinckenia perspectalis. Hübn.
1854. Larva. *Guen.* Spec. Gener. Delt. Pyral., vol. 8, p. 226.
FOOD PLANT. *Lilium canadense.*

Clydonopteron tecomæ. Riley.
1880. Larva, pupa, (figs.) *Riley.* Amer. Entom., vol. 1, 2d ser., p. 286.
FEEDS in seed-pods of *Tecoma radicans.*

Margarodes quadristigmalis. Guen.
1888. Life history. *Howard—Lugger.* Ins. Life, vol. 1, p. 22.
FOOD PLANT. *Ligustrum vulgare.*

Hydrocampa formosalis. Clemens.
1884. Larva, pupa, (figs.) *Packard.* Amer. Naturalist, vol. 18, p. 824, pl. 24.

Pinipestis zimmermanni. Grote.
1877. Life history. *Grote.* Canad. Entom., vol. 9, p. 161.
1877. Larva, cocoon, pupa. *Grote.* Rept. Entom. Soc. Ontario, p. 13.
1878. Larva, pupa. *Zimmerman.* Canad Entom., vol. 10, p. 20.
1879. Larva. *D. S. Kellicott.* Canad. Entom., vol. 11, p. 114.
1881. Larva, cocoon. *Packard,* (quotes Grote–Kellicott.) Ins. Inj. Forest Trees, p. 182.
FOOD PLANT. Species of *Pinus.*

Phycis rubrifasciella. Packard.
1873. Larva, pupa. *Packard.* Amer. Lyceum N. Hist. N. York, vol. 10, p. 268.
1889. Larva. *W. Beutenmüller.* Entom. Amer., vol. 5, p. 38.

Phycis indiginella. Zeller. = **nebulo.**
1863. Larva. *B. D. Walsh.* Proc. Boston Soc. N. Hist., vol. 9, p. 312.
1869. Larva, case. *Walsh.* 1st Illinois Rept., p. 34.
1870. Larva. *Saunders.* Canad. Entom., vol. 2, p. 126.
1872. Life history, (figs.) *Riley.* 4th Missouri Rept., pp. 38–42.
1872. Life history, (figs.) *Le Baron,* (after Riley.) 3d Illinois Rept., p. 117.
1877. Larva, (fig.) *French.* Trans. Dept. Agr. Ill., vol. 15, p. 249.
1880. Larva, case, (fig.) *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 157.
1883. Larva, case, (fig.) *Saunders.* Canad. Entom., vol. 15, p. 2.
1883. Larva, (fig.) *Saunders.* Rept. Entom. Soc. Ontario, p. 22.
1883. Larva (figs.) *Saunders.* Ins. Inj. Fruit, p. 94.
1885. Larva. *Fernald.* Kingley's Stand. N. Hist., vol. 2, p. 444.
FOOD PLANTS. *Prunus, Pyrus, etc.*

Phycis juglandis. Le Baron.
1872. Life history, (figs.) *Riley.* 4th Missouri Rept., p. 42.
1872. Life history (figs.) *Le Baron* (after Riley.) 3d Illinois Rept., p. 117.
1877. Larva, case, (fig.) *French.* Trans. Dept. Agr. Ill., vol. 15, p. 250.
1881. Larva, case, (figs.) *Packard,* (quotes Riley.) Ins. Inj. Fruit Trees, p. 82.
FOOD PLANTS. *Carya, Juglans.*

Phycis vaccinii. Riley.
1884. Life history. *Riley.* Canad. Entom., vol. 16, p. 237.
FOOD PLANT. *Oxycoccus.*

Phycis caryæ. Grote.

1881. Larva, pupa. *Grote*, (quotes Coquillett in lit.) Papilio, vol. 1, p. 13.

FOOD PLANT. *Carya.*

Tetralopha (Saluda) melanogrammos. Guen.

1880. Larva, pupa. *Comstock.* Rept. U. S. Dept. Agr., p. 263.

1889. Larva, pupa. *Hulst*, (quotes Comstock.) Entom. Amer., vol. 5, p. 68.

FOOD PLANT. *Pinus tæda.*

Pempelia hammondi. Riley.

1872. Larva, pupa, (figs.) *Riley.* 4th Missouri Rept., p. 44.

1877. Larva, pupa. *French*, (quotes Riley.) Trans. Dept. Agr. Ill., vol. 15, p. 253.

1883. Larva, cocoon, figs. *Saunders.* Ins. Inj. Fruits, p. 100.

FOOD PLANT. *Pyrus.*

Dakruma convolutella. Hübn. = **grossulariæ.** Packard.

1869. Larva, pupa, (figs.) *Riley.* 1st Missouri Rept., p. 140.

1869. Larva, case, (fig.) *Packard.* Guide to Study of Ins., p. 331.

1871. Larva, case, (fig.) *Saunders.* Rept. Entom. Soc. Ontario, p. 383.

1876. Larva, case, (figs.) *Saunders.* Rept. Entom. Soc. Ontario, p. 39.

1877. Larva, case, (brief.) *B. Gott.* Rept. Entom. Soc. Ontario, p. 43.

1877. Larva. *French*, (quotes Packard.) Trans. Dept. Agr. Ill., vol. 15, p. 251.

1883. Larva, case, (figs.) *Saunders.* Ins. Inj. Fruits, p. 358.

1885. Larva. *Fernald.* Kingsley's Stand. N. Hist., vol. 2, p. 444.

FOOD PLANT. *Ribes.*

Dakruma coccidivora. Comstock.

1879. Life history. *J. H. Comstock.* Proc. Amer. Ass. Adv. Sc., vol. 28, p. 467.

1879. Life history, (figs.) *J. H. Comstock.* North Amer. Entom., No. 4, p. 27.

1879. Life history. *J. H. Comstock.* Rept. U. S. Dept. Agr., p. 243.

FEEDS on Homopterous larvæ, (*Coccidæ.*)

Dakruma pallida. Comstock.

1879. Larva. *Comstock.* Rept. U. S. Dept. Agr., p. 244.

FOOD PLANT. *Quercus.*

Anæglis demissális. Lederer.

1885. Life history, (figs.) *Hubbard.* Ins. Affect. Orange, p. 155, pl. 13.

FOOD PLANT. *Citrus*, (Orange.)

Aphomia colonella. Linn. (Ilythia.)

1868. Pupa, (figs.) *Packard.* Amer. Naturalist, vol. 2, p. 333.

FEEDS on beeswax.

Galleria (Honora) **mellinella.** Fabr. = **cereana.**

1836. Larva, (col'd fig.) *Curtis.* Brit. Entom., vol. 13, pl. 587.

1840. Larva, (fig.) *Westwood.* Intr. Mod. Class. Ins., vol. 2, p. 411, fig. 113.

1841. Larva, pupa. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 357.

1852. Life history. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 384.

1854. Larva. *Emmons.* Nat. Hist. N. York, vol. 5, p. 253.

1857. Life history. *Chenu—Demarets.* Encyc. Hist. Nat. Papillons, vol. 2, p. 261.

1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths, vol. 2, p. 164.

1859. Larva, (col'd fig.) *Humphreys.* Gener. Brit. Moths, pl. 54.

1862. Life history. *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 491.

1864. Larva. *Jaeger.* Life N. Amer. Ins., p. 181.

1867. Larva. *Tenney.* Nat. Hist., p. 409.

1869. Life history, (figs.) *Riley.* 1st Missouri Rept., p. 166.

1872. Larva, (fig.) *J. G. Wood.* Insects at Home, p. 500.

1876. Larva, pupa, (figs.) *J. Williams.* Rept. Entom. Soc. Ontario, p. 46.

1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 253.

1885. Larva. *Fernald.* Kingsley's Stand. N. Hist., vol. 2, p. 443.

FEEDS on beeswax.

Ephestia elutella. Hübn.

1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths, vol. 2, p. 168.

FEEDS on dried fruit.

Ephestia interpunctella. Hübn.

1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths. vol. 2, p. 169.

FEEDS on dried fruits.

Crambus vulgivagelius. Clemens.

1882. Larva, pupa. *Lintner.* 41st Rept. N. York State Agr. Soc., p. 44.

1884. Larva, cocoon, (figs.) *H. A. Cutting.* 8th Rept. Vermont Board Agt., p. 276.

1885. Egg, larva. *Fernald.* Kingsley's Stand. N. Hist., vol. 2, p. 443.

FOOD PLANT. *Gramineæ.*

Crambus exsiccatus. Zeller.

1888. Life history. *H. Osborn.* Rept. Entom. Dept. Agr., p. 154.

Diaætria saccharalis. Fabr.

1881. Larva, pupa, (figs.) *J. H. Comstock.* Rept. Ins. Inj. Sugar, U. S. Dept. Agr., p. 9.

FEEDS on sugar-cane.

TORTRICIDÆ.

Teras hastiana. Linn.

1859. Larva, (brief.) *H. T. Stainton.* Brit. Butt. and Moths, vol. 2, p. 233.

FOOD PLANT. *Salix.*

Teras viburnana. Clem.

1886. Pupa. *Packard.* Rept. Entom. U. S. Dept. Agr., p. 332.

Teras permutana. Dupon.

1881. Larva. *Coquillett.* Papilio, vol. 1, p. 30.

1883. Larva. *Coquillett.* Papilio, vol. 3, p. 100.

FOOD PLANT. *Salix.*

Teras ferrugana. Schiff.

1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths, vol. 2, p. 235.

FOOD PLANT. *Betula.*

Teras occycoceana. Packard.

1881. Egg. *Riley.* Papilio, vol. 1, p. 110.

Teras cinderella. Riley.

1872. Larva, pupa, (figs.) *Riley.* 4th Missouri Rept., p. 46.

1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 255.

1883. Larva, pupa, (figs.) *Saunders.* Ins. Inj. Fruits, p. 98.

FOOD PLANT. *Pyrus,* (Apple.)

Teras malivorana. Le Baron.

1871. Larva, pupa. *Le Baron.* 4th Illinois Rept., p. 20.

1871. Larva, pupa. *Le Baron.* Amer. Naturalist, vol. 5, p. 210.

1872. Larva, pupa, (figs.) *Riley.* 4th Illinois Rept., p. 47.

1877. Larva. *French,* (quotes Le Baron.) Trans. Dept. Agr. Ill., vol. 15, p. 254.

1883. Larva, pupa. *Saunders.* Ins. Inj. Fruits, p. 92.

FOOD PLANT. *Pyrus,* (Apple.)

Teras vacciniivorana. Packard.

1883. Larva, pupa, (figs.) *Saunders.* Ins. Inj. Fruits, p. 370.

FOOD PLANT. *Vaccinium.*

Teras variana. Fernald.

1885. Larva. *Packard.* Bulletin No. 12, U. S. Dept. Agr., p. 18.

FOOD PLANT. *Abies.*

Cacœcia rosaceana. Harris.

1841. Larva, pupa. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 348.

1852. Life history, (brief.) *Harris.* Ins. Inj. Vegetat., 2d edit., p. 375.

1854. Egg, larva, pupa, (figs.) *Emmons,* Nat. Hist. N. York, vol. 5, p. 250, pl. 6,

1856. Larva. *Fitch.* 3d Rept. Ins. N. York, pp. 346, 358.
1862. Larva. *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 486.
1869. Larva. *Packard.* Guide to Study of Ins., p. 335.
1871. Larva, pupa, (figs.) *Saunders.* Rept. Entom. Soc. Ontario, p. 379.
1873. Larva, pupa, (figs.) *Saunders.* Rept. Entom. Soc. Ontario, p. 14.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 256.
1877. Larva. *Packard.* Half-hours with Insects, p. 61.
1880. Larva. *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 153.
1883. Larva. *Coquillett.* Papilio, vol. 3, p. 100.
1883. Larva, pupa, (figs.) *Saunders.* Ins. Inj. Fruits, p. 90.
1885. Larva. *Fernald.* Kingsley's Stand. N. Hist., vol. 2, p. 441.
FOOD PLANTS. *Rosa, Pyrus, etc.*

Cacœcia rosana. Linn.
1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths, vol. 2, p. 204.
FOOD PLANTS. *Rosa, etc.*

Cacœcia cerasivorana. Fitch.
1856. Larva. *Fitch.* 3d Rept. Ins. N. York, p. 382.
1883. Larva. *Coquillett.* Papilio, vol. 3, p. 102.
1883. Larva. *Saunders.* Ins. Inj. Fruits, p. 215.
1885. Egg, larva. *Fernald.* Kingsley's Stand. N. Hist., vol. 2, p. 441.
FOOD PLANT. *Cerasus virginiana.*

Cacœcia rileyana. Grote.
1869. Life history, (figs.) *Riley.* 1st Missouri Rept., p. 153.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 256.
1881. Larva. *Packard,* (quotes Riley.) Ins. Inj. Forest Trees p. 82.
FOOD PLANTS. *Carya, Symphoricarpus, etc.*

Cacœcia argyrospila. Walker.
1879. Pupa, (brief.) *Walsingham.* Illus. Lep. Heteroc. B. Mus., vol. 4, p. 9.
1886. Larva, pupa. *Packard.* Rept. U. S. Dept. Agr., p. 330.
FOOD PLANTS. Various trees and shrubs.

Cacœcia semiferana. Walker.
1883. Larva. *Coquillett.* Papilio, vol. 3, p. 100.
FOOD PLANT. *Polygonum.*

Cacœcia fervidana. Clemens.
1880. Larva. *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 154.
FOOD PLANTS. *Cerasus, Quercus.*

Loxotænia afflictana. Walker.
1879. Larva, (brief.) *Walsingham.* Lep. Heteroc. B. Mus., vol. 4, p. 15.
FOOD PLANT. *Abies.*

Ptycholoma persicana. Fitch.
1856. Larva. *Fitch.* 3d Rept. Ins. N. York, p. 357.
1883. Larva. *Saunders.* Ins. Inj. Fruits, p. 197.
FOOD PLANT. *Persica vulgaris,* (Peach.)

Lophoderus ministrana. Linn.
1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths, vol. 2, p. 192.
FOOD PLANT. *Corylus.*

Lophoderus triferana. Walker.
1870. Larva. *Packard.* Inj. Ins., new or little known, p. 8.
FOOD PLANT. *Oocycoccus.*

Tortrix quercifoliana. Fitch.
1858. Larva. *Fitch.* 5th Rept. Ins. N. York, p. 826.
1877. Larva, pupa. *Emma A. Smith.* Trans. Dept. Agr. Ill., vol. 15, p. 114.
1879. Larva, pupa, (figs.) *C. Thomas.* Trans. Dept. Agr. Ill., vol. 17, Append., p. 142.
1880. Larva. *Coquillett.* Papilio, vol. 3, p. 100.
FOOD PLANT. *Quercus.*

Tortrix fumiferana. Clemens.

1885. Egg, larva. *Fernald.* Kingsley's Stand. N. Hist., vol. 2, p. 442.

FOOD PLANTS. *Abies, etc.*

Tortrix pallorana. Robinson.

1883. Larva. *Coquillett.* Papilio, vol. 3, p. 100.

FOOD PLANTS. *Verbena, Cerasus, etc.*

Tortrix bergmanniana. Linn.

1837. Life history, (figs) *Westwood.* Loudon's Gardeners' Magazine, No. 90.

1840. Larva, pupa, (figs.) *Westwood.* Intr. Mod. Class. Ins., vol. 2, p. 403, fig. 111.

1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths, vol. 2, p. 228.

FOOD PLANT. *Rosa.*

Synnoma linosyrana. Walsingham.

1879. Larva, cocoon. *Walsingham.* Illus. Lep. Heteroc. B. Mus., vol. 4, p. 25.

FOOD PLANT. *Linosyris viscidiflora.*

Œnectra senecionana. Walsingham.

1879. Larva, (brief.) *Walsingham.* Illus. Lep. Heteroc. B. Mus., vol. 4, p. 17.

FOOD PLANT. *Senecio.*

Œnectra pilleriana. Schiff.

1857. Life history, (fig.) *Chenu—Demarets.* Encyl. Hist. Nat. Papillons, vol. 2, p. 242, pl. 32.

1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths, vol. 2, p. 197.

FEEDS in pods of *Iris.*

Cenopis reticulatana. Clemens.

1853. Larva. *Coquillett.* Papilio, vol. 3, p. 99.

FOOD PLANTS. *Geranium, Chenopodium.*

Dichelia sulfureana. Clemens.

1883. Larva. *Coquillett.* Papilio, vol. 3, p. 99.

1885. Larva. *Hubbard.* Ins. Affect. Orange, p. 154.

FOOD PLANTS. *Verbena, Pinus, Citrus.*

Platynota rostrana. Walker.

1883. Larva. *Saunders.* Ins. Inj. Fruits, p. 381.

1885. Larva, pupa, (fig.) *Hubbard.* Ins. Affect. Orange, p. 152.

FOOD PLANTS. *Citrus, etc.*

Conchylis rutilana. Hübn.

1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths, vol. 2, p. 277.

1878. Life history, (fig.) *Riley.* Rept. U. S. Dept. Agr., p.

1880. Larva. *Coquillett,* (quotes Riley.) Trans. Dept. Agr. Ill., vol. 18, Append., p. 153.

1881. Larva, pupa, (fig.) *Packard,* (quotes Riley.) Ins. Inj. Forest Trees, p. 249.

FOOD PLANT. *Juniperus.*

Retinia frustrana. Scudder.

1879. Larva, (fig.) *J. H. Comstock.* Rept. Dept. Agr., p. 236.

1881. Larva, pupa, (figs.) *Packard,* (after Comstock.) Ins. Inj. Forest Trees, p. 193.

1883. Life history, (col'd figs.) *Scudder.* Publ. Massach. Soc. Prom. Agr.

FOOD PLANT. *Pinus rigida.*

Retinia rigidana. Fernald.

1879. Larva. *J. H. Comstock.* Rept. Dept. Agr., p. 236.

1881. Larva. *Packard,* (quotes Comstock.) Ins. Inj. Forest Trees, p. 194.

FOOD PLANT. *Pinus rigida.*

Retinia sylvestrana. Curtis.

1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths, vol. 2, p. 248.

FOOD PLANT. *Pinus.*

Retinia comstockiana. Fernald.

1879. Larva, pupa, (fig.) *J. H. Comstock.* Rept. U. S. Dept. Agr., p. 235.

1881. Larva, pupa, (figs.) *Packard*, (quotes Comstock.) Ins. Inj. Forest Trees, p. 189.
1883. Larva, (fig.) *Saunders*. Rept. Entom. Soc. Ontario, p. 58.
FOOD PLANT. *Pinus rigida*.

Eudemis botrana. Schiff. = **vitivorana.** Pack.
1869. Life history, (figs.) *Riley*. 1st Missouri Rept., p. 133.
1869. Larva. *Packard*. Guide to Study of Ins , p. 336.
1870. Larva, cocoon, (figs.) *T. Glover*, (quotes Riley) Rept U. S Dept. Agr., p. 86.
1877. Larva. *French*, (quotes Packard.) Trans. Dept. Agr. Ill., vol. 15, p. 257.
1881. Larva, pupa. *W. W. Goldsmith*, (quotes Riley.) Rept. Kentucky Bureau Agr., p. 257.
1882. Larva, (fig.) *Saunders*. Rept. Entom. Soc. Ontario, p. 67.
1882. Life history. *Saunders*. Canad. Entom., vol. 14, p. 178.
1883. Larva. *Coquillett*. Papilio, vol. 3, p. 102.
1883. Larva, pupa, (figs.) *Saunders*. Ins. Inj. Fruits, p. 299.
1883. Larva, (fig.) *Saunders*. Rept. Entom. Soc. Ontario, p. 26.
1883. Larva, (fig.) *T. J. Edge*. Agr. Pennsylv., p. 71.
FOOD PLANTS. *Vitis, Circium lanceolatum*.

Bactra lanceolana. Hübn.
1859. Larva. *H. T. Stainton*. Brit. Butt and Moths, vol. 2, p. 226.
FOOD PLANT. *Juncus*.

Eccopsis fagigemmæana. Chambers.
1878. Larva, case. *Chambers*. Canad. Entom., vol. 10, p. 75.
FOOD PLANT. *Fagus sylvatica*.

Eccopsis permundana. Clemens.
1883. Larva. *Saunders*. Ins. Inj. Fruits, p. 324.
1883. Larva. *S. A. Forbes*, (quotes Saunders.) Trans. Wisconsin Agr. Soc., p. 13.
1883. Larva. *Coquillett*. Papilio, vol. 3, p. 102.
1886. Larva, pupa. *Packard*. Rept. Entom., Dept. Agr., p. 331.
FOOD PLANTS. *Rosa, Spiræa, Corylus*.

Eccopsis versicolorana. Clem.
1886. Pupa. *Packard*. Rept. Entom. U. S. Dept. Agr., p. 331.

Eccopsis fasciatana. Clemens.
1880. Larva. *Coquillett*. Trans. Dept. Agr. Ill., vol. 18, Append., p. 153.
FOOD PLANT. *Rumex*.

Eccopsis malana. Fernald.
1883. Larva. *Saunders*. Ins. Inj. Fruits, p. 97.

Penthina nimbatana. Clemens.
1880. Larva. *Coquillett*. Trans. Dept. Agr. Ill., vol. 18, Append., p. 153.
1883. Larva. *Coquillett*. Papilio, vol. 3, p. 101.
FOOD PLANT. *Rosa blanda*.

Penthina osmundana. Fernald.
1879. Larva, (brief.) *Fernald*. Canad. Entom., vol. 11, p. 157.
FOOD PLANT. *Osmunda regalis*.

Penthina capreana. Hübn.
1859. Larva, (brief.) *H. T. Stainton*. Brit. Butt. and Moths, vol. 2, p. 194.
FOOD PLANT. *Salix*.

Penthina hebesana. Walker.
1883. Larva. *Coquillett*. Papilio, vol. 3, p. 101.
FOOD PLANT. *Stachys palustris*.

Penthina cyanana. Murtfeldt.
1880. Larva, pupa. *Mary E. Murtfeldt*. Amer. Entom., vol. 1, 2d ser., p. 15.

Pædisca saligneana. Clemens.
1870. Larva, (figs.) *Riley*. 2d Missouri Rept., p. 134.

1878. Larva, pupa. *D. Kellicott.* Canad. Entom., vol. 10, p. 202.
FOOD PLANT. *Solidago,* (forming galls).

Pædisca scudderiana. Clemens.
1882. Life history, (brief.) *D. Kellicott.* Canad. Entom., vol. 14, p. 161.
FOOD PLANT. *Solidago,* (forming galls.)

Semasia artemisiana. Walsingham.
1879. Larva, (brief.) *Walsingham.* Lep. Heteroc. B. Mus., vol. 4, p. 57.
FOOD PLANT. *Artemisia.*

Tmetocera ocellana. Schiff.
1841. Larva, pupa. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 349.
1852. Larva. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 377.
1856. Larva. *Fitch.* 3d Rept. Nox. Ins. N. York, p. 345.
1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths, vol. 2, p. 219.
1862. Larva. *Harris.* Ins. Inj. Vegetat., Flint's edit., p 482.
1870. Larva. *Packard.* Inj. Ins., new or little known, p. 1.
1871. Larva, (fig.) *E. B. Reed.* Rept. Entom. Soc. Ontario, p. 366.
1876. Larva. *G. H. Perkins.* 2d Rept. Vermont State Board Agr., p. 588.
1877. Larva. *Packard.* Half-hours with Insects, p. 181.
1883 Larva, (fig.) *Saunders.* Ins. Inj. Fruits, p. 95.
1885. Larva, (fig.) *J. Fletcher.* Rept. Entom. Dept. Agr Ontario, p. 24.
FOOD PLANTS. *Pyrus malus* and other trees.

Steganoptycha angustana. Hübn.
1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths, vol. 2, p. 191.
FOOD PLANT. *Salix.*

Steganoptycha claypoleana. Riley.
1883. Larva, (brief.) *Riley.* Papilio, vol. 3, p. 191.
FOOD PLANT. *Æsculus.*

Rhopobota vacciniana. Packard.
1869. Larva, pupa. *Packard.* Guide to Study of Ins., p. 339.
1870. Larva, cocoon. *T. Glover.* Rept. U. S. Dept. Agr., p. 85.
1883. Larva, pupa, (fig.) *Saunders.* Ins. Inj. Fruits, p. 369.
FOOD PLANT. *Vaccinium.*

Phoxopteris nubeculana. Clemens.
1880. Larva. *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 153.
1883. Larva, (fig.) *Saunders.* Ins. Inj. Fruits, p. 99.
FOOD PLANT. *Pyrus malus,* (Apple.)

Phoxopteris lundana. Fabr.
1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths, vol. 2, p. 225.
FOOD PLANTS. *Lathyrus, Vicia.*

Phoxopteris fragariæ. Walsh.
1869. Life history, (figs.) *Riley.* 1st Missouri Rept., p. 142.
1869. Larva, (figs.) *Packard.* Guide to Study of Ins., p. 340.
1887. Larva. *French,* (quotes Riley.) Trans. Dept. Agr. Ill., vol. 15, p. 258.
1880. Larva, (fig.) *A. S. Fuller.* Amer. Entom., vol. 1, 2d ser., p. 110.
1883. Larva, (fig.) *S. A. Forbes.* Trans. Wisconsin Agr. Soc., vol. 21, p. 12.
1883. Larva, pupa, (fig.) *Saunders.* Ins. Inj. Fruits, p. 223.
FOOD PLANT. *Fragaria.*

Phoxopteris spiræafoliana. Clem.
1889. Larva. *W. Beutenmüller.* Entom. Amer., vol. 5., p. 39.

Grapholitha caryana. Fitch.
1856. Larva, pupa. *Fitch.* 3d Rept. Ins. N. York, p. 459.
1881. Larva. *Packard,* (quotes Fitch.) Ins. Inj. Forest Trees, p. 83.
FEEDS on the rind of nuts of *Carya, Juglans.*

Grapholitha prunivora. Walsh.
[illegible]. *Walsh.* 1st Illinois Report, p. 78.
[illegible] *Prunus.*

Carpocapsa pomonella. Linn.

1819. Life history. *J. Tufts.* Massachusetts Agr. Repository.
1832. Life history, (brief.) *Harris.* Trans. Mass. Hort. Soc., p. 42.
1837. Life history, (figs.) *Kollar.* Inj. Ins. (Loudon's edit.), p. 229.
1838. Life history, (brief.) *Westwood.* Loudon's Gardeners' Magazine.
1840. Larval stages, pupa. *J. Burrelle.* N. Engl'd Farmer, vol 18, p. 398.
1840. Larva, pupa, (col'd figs.) *Ratzeburg.* Die Forst-Insecten, vol. 2, p. 234, pl. 14.
1841. Larva, pupa. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 351.
1843. Larva. *W. Gaylord.* Trans. N. York State Agr. Soc., p. 158.
1843. Larva. *Harris.* N. Engl'd Farmer, vol. 22, p. 13.
1852. Life history. *Harris.* Ins. Inj. Vegetat., 2d edit., p. 379.
1855. Larva, pupa, (figs.) *Fitch.* 2d Rept. Ins. N. York, p. 221.
1856. Larva. *Fitch.* 3d Rept. Ins. N. York, p. 347.
1857. Life history. *Chenu—Demarets.* Encyc. Hist. Nat. Papillons, vol. 2, p. 247.
1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths, vol. 2, p. 253.
1859. Larva, (col'd fig.) *Humphreys.* Gener. Brit. Moths, pl. 51.
1862. Life history. *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 484.
1863. Larva, (figs.) *J. G. Wood.* Nat. Hist., vol. 2, p. 542.
1864. Larva. *Jaeger.* Life N. Amer. Ins., p. 179.
1865. Larva. *Walsh.* Practical Entom., p. 34.
1869. Life history, (figs.) *Riley.* 1st Missouri Rept., p. 62.
1869. Life history. *Walsh.* 1st Illinois Rept., p. 27.
1869. Larva, cocoon, (brief.) *Packard.* Guide to Study of Ins., p. 341.
1870. Larva, pupa, (figs.) *T. Glover.* Rept. U. S. Dept. Agr., p. 86.
1871. Larva, (fig.) *Saunders.* Canad. Entom., vol. 3, p. 27.
1871. Larva, pupa, (fig.) *Bethune.* Rept. Entom. Soc. Ontario, p. 355.
1873. Larva, cocoon, pupa, (figs.) *A. J. Cook.* 12th Rept. Michigan Board Agr., p. 123.
1873. Life history, (figs.) *Le Baron,* (after Riley.) 4th Ill. Rept., p. 167.
1874. Larva, cocoon, pupa, (figs.) *Saunders.* Rept. Entom. Soc. Ontario, p. 42.
1876. Larva, cocoon, pupa, (figs.) *G. H. Perkins.* 3d Rept. Vermont Board Agr., p. 583.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 260.
1877. Larva, cocoon, pupa. *Packard.* Half-hours with Ins., p. 191.
1877. Larva, pupa, (fig.) *Packard.* Ins. Inj. West, Hayden's Rept., p. 794.
1877. Larva, cocoon, pupa, (fig.) *B. Gott.* Rept. Entom. Soc. Ontario, p. 46.
1878. Larva, cocoon, pupa, (fig.) *S. S. Rathvon.* Agr. Pennsylv., p. 605.
1879. Larva, pupa, (fig.) *H. Cutting.* Rept. N. Hampshire Board Agr., p. 24.
1880. Larva, cocoon, pupa, (figs.) *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 151.
1882. Life history, (brief.) *Bethune.* 12th Rept. Entom. Soc. Ontario, p. 76.
1882. Larva, (col'd fig.) *W. F. Kirby.* Europ. Butt. and Moths, p. 413, pl. 62.
1883. Larva, cocoon, pupa, (figs.) *Saunders.* Ins. Inj. Fruits, p. 129.
1883. Larva, cocoon, pupa, (figs.) *S. S. Rathvon.* Agr. Pennsylv., p. 50.
1885. Egg, larva, cocoon. *Fernald.* Kingsley's Stand. N. Hist., vol. 2, p. 442.
1885. Larva. *Lintner.* Rept. Massachusetts Board Agr., p. 184.
1885. Larva, cocoon, pupa, (figs.) *A. J. Cook.* 24th Rept. Michigan Board Agr., p. 171.
1887. Larva, pupa, (figs.) *J. Fletcher.* Rept. Entom. Dept. Agr. Canad., p. 19.
1888. Larva, pupa, (figs.) *J. Fletcher.* Rept. Bot. Entom. Canad., p. 19.
1888. Life history, (col'd figs.) *L. O. Howard.* Rept. Entom. Dept. Agr., p. 68, pl. 2.

FEEDS on the fruit of *Pyrus,* (Apple.)

Carpocapsa saltitans. Westwood.

1876. Larva, pupa. *Riley.* Amer. Natural., vol. 10, p. 216.

1888. Larva, pupa, (figs.) *Lintner.* 4th Rept. N. York State Entom., p. 151.
FEEDS in seed-pods of *Euphorbiaceous* plant.

TINEIDÆ.

Anaphora agrotipennella. Grote.
1876. Larva, pupa. *Miss M. E. Murtfeldt.* Canad. Entom., vol. 8, p. 185.

Solenobia walshella. Clemens.
1861. Larva, (brief.) *Clemens,* (quotes Walsh in lit.) Proc. Entom. Soc. Philad., vol. 1, p. 132.
1872. Larva, cocoon. *Clemens.* Tineina of N. Amer. (Stainton), p. 182.
FOOD PLANT. *Lichens.*

Xylesthia pruniramiella. Clemens.
1859. Larva. *Clemens.* Proc. Acad. N. Sc., Philad., September.
1872. Larva. *Clemens.* Tineina of N. Amer. (Stainton), p. 54.
FEEDS on woody nodules of plum trees.

Tinea tapetzella. Linn.
1857. Larva, case. *Chenu—Demarets.* Encyc. Hist. Nat. Papillons, vol. 2, p. 289.
1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths, vol. 2, p. 290.
1859. Larva. *Humphreys.* Gener. Brit. Moths, p. 167.
1864. Larva, cocoon. *Jaeger.* Life N. Amer. Ins., p. 186.
1872. Larva, cocoon, (figs.) *L. Figuier.* Insect world, p. 280.
1877. Larva, cocoon, (fig.) *Packard.* Half-hours with Insects, p. 311.
FEEDS on woolen fabrics.

Tinea pellionella. Linn.
1841. Larva, pupa. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 361.
1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths, vol. 2, p. 293.
1859. Egg, larva. *Clemens.* Proc. Acad. Nat. Sc. Philad., September.
1867. Larva, case, pupa, (fig.) *Packard,* (as T. flavifrontella.) Amer. Naturalist, vol. 1, p. 423.
1872. Egg, larva. *Clemens.* Tineina of N. Amer. (Stainton), p. 51.
1873. Larva, case, pupa, (fig.) *J. Williams,* (as T. flavifrontella.) Rept. Entom. Soc. Ontario, p. 27.
1873. Larva, pupa. *A. J. Cook,* (as T. flavifrontalis.) 12th Rept. Michigan Board Agr., p. 151.
1885. Larva, case, pupa. *Fernald.* Kingsley's Stand. N. Hist., vol. 2, p. 439.
FEEDS on woolen fabrics, feathers, etc.

Tinea biselliella. Hummel.
1859. Larva, (brief.) *H. T. Stainton.* Brit. Butt. and Moths, vol. 2, p. 293.
1859. Egg, larva. *Clemens,* (as T. carnariella.) Proc. Acad. Nat. Sc. Philad., September.
1872. Egg, larva. *Clemens.* Tineina N. Amer. (Stainton), p. 52.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 265.
FEEDS on hair, feathers, etc.

Tinea granella. Linn.
1837. Life history. *Koller.* Inj. Insects (Loudon's edit.), p. 111.
1841. Larva, pupa. *Harris.* Ins. Inj. Vegetat., 1st edit., p. 366.
1842. Larva, pupa, (figs.) *Curtis.* Journ. Royal Agric. Soc. England, p. 65.
1852. Life history, (brief.) *Harris.* Ins. Inj. Vegetat., 2d edit., p. 390.
1854. Larva. *Emmons.* Nat. Hist. N. York, vol. 5, p. 256.
1857. Life history. *Chenu—Demarets.* Encyc. Hist. Nat. Papillons, vol. 2, p. 290.
1859. Larva, (brief.) *H. T. Stainton.* Brit. Butt. and Moths, vol. 2, p. 291.
1862. Egg, larva, (figs.) *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 494.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 266.
1877. Larva. *Packard.* Inj. Ins. West, Hayden's Rept., p. 715.
1883. Larva, (fig.) *T. J. Edge.* Agr. Pennsylv.

1885. Egg, larva, pupa, (figs.) *Fernald.* Kingsley's Stand. N. Hist., vol. 2, p. 439.

FEEDS on corn in granaries.

Tinea dorsitrigella. Clemens.

1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 262.

FEEDS on woolen fabrics, etc.

Eudarcia simulatricella. Clemens.

1873. Larva, case. *V. T. Chambers,* (as T. cunitariella.) Canad. Entom., vol. 5, p. 85.

Incurvaria acerifoliella. Fitch.

1856. Larva. *Fitch.* 2d Rept. Ins. N. York, p. 269.

1881. Larva. *Packard.* Ins. Inj. Forest Trees, p. 114.

1885. Larva. *J. Fletcher.* Rept. Entom. Dept. Agr. Ontario, p. 31.

FOOD PLANT. *Acer.*

Hyponomeuta evonymella. Chambers.

1872. Larva. *Chambers.* Canad. Entom., vol. 4, p. 42.

FOOD PLANT. *Euonymus atropurpureus.*

Tonuba yuccasella. Riley.

1873. Life history, (figs.) *Riley.* 5th Missouri Rept., p. 150.

1873. Larva, pupa, (figs.) *Packard,* (quotes Riley.) Amer. Naturalist, vol. 7, p. 477.

1874. Pupa, (fig.) *Riley.* 6th Missouri Rept., p. 131.

FOOD PLANT. *Yucca.*

Prodoxus decipiens. Riley.

1880. Larva, case, pupa. *Riley.* Amer. Entom., vol. 1, 2d ser., p. 143.

Plutella cruciferarum. Zeller.= **limbipennella.** Clem.

1856. Larva, case, pupa, (figs.) *Fitch,* (as C. brassicella.) 1st Rept. Ins. N. York, p. 172.

1871. Larva, case, (figs.) *T. Glover.* Rept. U. S. Dept. Agr., p. 82.

1872. Larva, pupa, (figs.) *T. Glover.* Trans. N. York Agr. Soc., p. 82.

1877. Larva, case, (fig.) *Packard.* Half-hours with Insects, p. 59.

1877. Larva, case, pupa. *Packard,* (as P. xylostella.) Inj. Ins. West, Hayden's Rept., p. 751.

1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 267.

1879. Larva, pupa. *C. Thomas.* Trans. Dept. Agr. Ill., vol. 17, Append., p. 52.

1885. Larva, cocoon. *Fernald,* (as P. xylostella.) Kingsley's Stand. N. Hist., vol. 2, p. 440.

FOOD PLANT. *Cruciferæ.*

Depressaria heracliana. De Geer.

1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths, vol. 2, p. 329.

1869. Larva. *Bethune,* (as D. ontariella.) Canad. Entom., vol. 2, p. 1.

1880. Larva, cocoon, pupa. *A. J. Cook.* 19th Rept. Michigan Board Agr., p. 275.

1883. Larva. *Hy. Edwards.* Papilio, vol. 3, p. 24.

1888. Larva, pupa, (figs.) *Riley.* Ins. Life, vol. 1, p. 94.

FEEDS in stems of *Umbelliferæ.*

Depressaria hilarella. Zeller.

1883. Larva. *Coquillett.* Papilio, vol. 3, p. 98.

FOOD PLANT. *Sanicula.*

Depressaria grotella. Robinson.

1883. Larva. *Coquillett.* Papilio, vol. 3, p. 98.

FOOD PLANT. *Corylus americana.*

Depressaria atrodorrella. Clemens.

1883. Larva. *Coquillett.* Papilio, vol. 3, p. 98.

FOOD PLANT. *Bidens frondosa.*

Depressaria pulvipennella. Clemens.

1883. Larva. *Coquillett.* Papilio, vol. 3, p. 97.

FOOD PLANT. *Solidago.*

Depressaria robiniella. Packard.

1881. Larva, (brief.) *Packard.* Ins. Inj. Forest Trees, p. 98.

FOOD PLANT. *Robinia.*

Adrastela quercifoliella. Chambers.

1872. Larva. *Chambers.* Canad. Entom., vol. 4, p. 207.

FOOD PLANT. *Quercus.*

Cryptolechia quercicella. Clemens.

1860. Larva. *Clemens.* Proc. Acad. Nat. Sc. Philad., June.

1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), p. 150.

1872. Larva. *Chambers,* (as H. fagimella). Canad. Entom., vol. 4, p. 182.

FOOD PLANT. *Quercus.*

Cryptolechia tentoriferella. Clemens.

1860. Larva, cocoon, pupa. *Clemens.* Proc. Acad. N. Sc. Philad., June.

1872. Larva, cocoon, pupa. *Clemens.* Tineina N. Amer. (Stainton), p. 150.

FOOD PLANTS. *Quercus, Cerasus, Carya.*

Gelechia robiniella. Fitch.

1858. Larva. *Fitch,* (as Anacampsis robiniella.) 5th Rept. Ins. N. York, p. 834.

FOOD PLANT. *Robinia.*

Gelechia solaniella. Chambers.

1873. Larva. *Chambers.* Cand. Entom., vol. 5, p. 176.

1878. Larva, cocoon. *Chambers,* (quotes Miss Murtfeldt in lit.) Canad. Entom., vol. 10, p. 51.

FOOD PLANT. *Solanum carolinense.*

Gelechia quercicella. Chambers.

1872. Larva. *Chambers,* (as Dep. quer.) Canad. Entom., vol. 4, p. 128.

FOOD PLANT. *Quercus.*

Gelechia juncidella. Clemens.

1871. Larva, case, pupa. *Miss Murtfeldt,* (as Dep. dubitella.) Canad. Entom., vol. 6, p. 221.

FOOD PLANT. *Ambrosia.*

Gelechia cercerisella. Chambers.

1872. Larva. *Chambers,* (as Depr. cerc.) Canad. Entom., vol. 4, p. 108.

FOOD PLANT. *Cercis canadensis.*

Gelechia platanella. Chambers.

1872. Larva. *Chambers.* Canad. Entom., vol. 4, p. 146.

FOOD PLANT. *Platanus occidentalis.*

Gelechia gallaegenitella. Clemens.

1864. Larva. *Clemens.* Proc. Entom. Soc. Philad., vol. 2, p.

1872. Larva. *Clemens.* Tineina, N. Amer. (Stainton), p. 243.

FEEDS on oak-galls.

Gelechia cerealella. Olivier.

1768. Larval stages, habits. *Landos Carter.* Trans. Amer. Philos. Soc., vol. 1.

1818. Larva. *E. Ruffin.* Farmers' Register.

1846. Life history, (figs.) *Rd. Owen.* The Cultivator, July and November.

1847. Larva. *E. Ruffin.* Amer. Agr., pp. 52, 93.

1852. Life history, (brief.) *Harris.* Ins. Inj. Vegetat., 2d edit., p. 392.

1854. Larva. *Emmons.* N. Hist. N. York, vol. 5, p. 254.

1861. Life history. *Fitch.* 1st Rept. Ins. N. York, p. 814.

1862. Egg, larva. *Harris.* Ins. Inj. Vegetat., Flint's edit., p. 501.

1864. Larva. *Jaeger.* Life N. Amer. Ins., p. 184.

1867. Larva. *Treacy.* Nat. Hist., p. 411.

1871. Larva. *Bethune.* Rept. Entom. Soc. Ontario, p. 401.

1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 286.

1877. Larva, (fig.) *Packard.* Inj. Ins. West, Hayden's Rept., p. 714.
1885. Life history, (figs.) *Lintner.* 2d Rept. N. York State Entom., p. 109.
FEEDS on grain of wheat, barley, etc.

Gelechia agrimoniella. Clemens.
1860. Larva. *Clemens.* Proc. Acad. Nat. Sc. Philad., May.
1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), p. 112.
1883. Larva. *Coquillett.* Papilio, vol. 3, p. 98.
FOOD PLANT. *Agrimonia eupatoria.*

Gelechia rhoifructella. Clemens.
1860. Larva. *Clemens.* Proc. Acad. Nat. Sc. Philad., May.
1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), p. 114.
1883. Larva. *Coquillett.* Papilio, vol. 3, p. 99.
FOOD PLANTS. *Rhus, Populus.*

Gelechia fungivorella. Clemens.
1864. Larva. *Clemens.* Proc. Entom. Soc. Philad., vol. 2, p.
1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), p. 262.
FEEDS on galls of *Salix.*

Gelechia salicifungella. Clemens.
1864. Larva. Proc. Entom. Soc. Philad., vol. 2, p.
1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), p. 262.
FEEDS on galls of *Salix.*

Gelechia scutellariella. Chambers.
1873. Larva. *Chambers.* Canad. Entom., vol. 5, p. 175.
FOOD PLANT. *Scutellaria.*

Gelechia rubensella. Chambers.
1874. Larva. *Miss Murtfeldt.* Canad. Entom., vol. 6, p. 221.
FOOD PLANT. *Quercus.*

Gelechia ambrosiella. Chambers.
1875. Larva. *Chambers.* Cincinnati Quart. Jour. Sc., p. 240.
FOOD PLANT. *Ambrosia.*

Gelechia pseudacaciella. Chambers.
1872. Larva. *Chambers.* Canad. Entom., vol. 4, p. 107.
1879. Larva. *J. H. Comstock.* Rept. U. S. Dept. Agr., p. 253.
1880. Larva. *Chambers.* Psyche, vol. 3, p. 65.
1881. Larva. *Packard.* Ins. Inj. Forest Trees, p. 99.
FOOD PLANT. *Robinia pseudacacia.*

Gelechia pinifoliella. Chambers.
1879. Egg, larva, pupa, (figs.) *Comstock.* Rept. U. S. Dept. Agr., p. 240.
1881. Larva, pupa, (figs.) *Packard,* (quotes Comstock.) Ins. Inj. Forest Trees, p. 208.
1883. Larva, (fig.) *Saunders.* Rept. Entom. Soc. Ontario, p. 59.
FOOD PLANT. *Pinus rigida.*

Gelechia robinifoliella. Chambers.
1879. Larva, pupa. *Comstock.* Rept. U. S. Dept. Agr., p. 225.
1881. Larva. *Packard.* Ins. Inj. Forest Trees, p. 99.
FOOD PLANT. *Robinia.*

Gelechia physaliella. Chambers.
1872. Larva. *Chambers.* Canad. Entom., vol. 4, p. 173.
FOOD PLANT. *Physalis viscosa.*

Gelechia quinqueannulella. Chambers.
1872. Larva. *Chambers.* Canad. Entom., vol. 4, p. 192.
FOOD PLANT. *Quercus tinctoria.*

Gelechia quercinigræella. Chambers.
1872. Larva. *Chambers.* Canad. Entom., vol. 4, p. 171.
FOOD PLANT. *Quercus nigra.*

Gelechia quercivorella. Chambers.
1872. Larva. *Chambers.* Canad. Entom., vol. 4, p. 173.
FOOD PLANT. *Quercus.*
Gelechia discococella. Chambers.
1883. Larva. *Coquillett.* Papilio, vol. 3, p. 98.
FOOD PLANT. *Polygonum.*
Gelechia obliquistrigella. Chambers.
1885. Larva, pupa. *Packard.* Bulletin No. 12, U. S. Dept. Agr., p. 21.
FOOD PLANT. Buds of *Abies.*
Gelechia trististrigella. Walsingham.
1883. Larva. *Coquillett.* Papilio, vol. 3, p. 99.
FOOD PLANT. *Corylus.*
Gelechia prunifoliella. Chambers.
1873. Larva. *Chambers,* (as Evippe prunif.) Canad. Entom., vol. 5, p. 186.
FOOD PLANT. *Prunus.*
Gelechia gallæsolidaginis. Riley.
1869. Life history, (figs.) *Riley.* 1st Missouri Rept., p. 173.
FEEDS in galls of *Solidago.*
Gelechia abietisella. Packard.
1884. Larva. *Packard.* Amer. Naturalist, vol. 18, p. 296.
Gelechia gallæasterella. Kellicott.
1878. Larva, pupa. *Kellicott.* Canad. Entom., vol. 10, p. 203.
Gelechia flavocortella. Clemens.
1880. Larva. *Coquillett.* Trans. Dept. Agr. Ill., vol. 18, Append., p. 153.
FOOD PLANT. *Helianthus.*
Gelechia beneficentella. Murtfeldt.
1881. Larva, pupa. *Mary E. Murtfeldt.* Canad. Entom., vol. 13, p. 245.
FOOD PLANT. *Solanum carolinense.*
Gelechia cinerella. Murtfeldt.
1881. Larva, cocoon. *Mary E. Murtfeldt.* Canad. Entom., vol. 13, p. 244.
FOOD PLANT. *Solanum carolinense.*
Gelechia formosella. Murtfeldt.
1881. Larva, cocoon. *Mary E. Murtfeldt.* Canad. Entom., vol. 13, p. 244.
FOOD PLANT. Laurel oak, (*Quercus.*)
Gelechia chambersella. Murtfeldt.
1881. Larva, cocoon. *Mary E. Murtfeldt.* Canad. Entom., vol. 13, p. 243.
FOOD PLANT. *Ambrosia.*
Trypanisma prudens. Clemens.
1860. Larva, pupa. *Clemens.* Proc. Acad. Nat. Sc. Philad., May.
1872. Larva, pupa. *Clemens.* Tineina N. Amer. (Stainton), p. 126.
FOOD PLANT. *Quercus.*
Menesta tortriciformella. Clemens.
1875. Larva, cocoon. *Chambers,* (as Hyale coryliella.) Cincinnati Quart. Jour. Sc., p. 242.
FOOD PLANT. *Corylus.*
Anarsia lineatella. Zeller.
1860. Larva. *Clemens,* (as A. pruniella.) Proc. Acad. Nat. Sc. Philad., May.
1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), p. 128.
1878. Larval stages. *Lintner.* Rept. N. York State Agr. Soc., p. 69.
1879. Larva. *J. H. Comstock.* Rept. U. S. Dept. Agr., p. 255.
1883. Larva, (fig.) *S. A. Forbes.* Trans. Wisconsin Agr. Soc., vol. 21, p. 26.
1883. Larva, pupa, (figs.) *Saunders.* Ins. Inj. Fruits, p. 321.
FOOD PLANTS. *Persica, Fragaria.*
Ypsolophus querciella. Chambers.
1872. Larva. *Chambers.* Canad. Entom., vol. 4, p. 223.
FOOD PLANT. *Quercus.*

Ypsolophus caryæfoliella. Chambers.
1872. Larva. *Chambers.* Canad. Entom., vol. 4, p. 224.
FOOD PLANT. *Carya alba.*

Ypsolophus pometellus. Harris, (and vars.)
1853. Larva, pupa. *Harris.* Jour. N. York State Agr. Soc., p. 103.
1854. Larva. *Emmons.* Nat. Hist. N. York, vol. 5, p. 254.
1856. Larva. *Fitch.* 2d Rept. Ins. N. York, p. 231.
1857. Larva. *Fitch.* 3d Rept. Ins. N. York, p. 345.
1872. Larva. *Chambers,* (as Y. quercipomonella.) Canad. Entom., vol. 4, p. 223.
1877. Larva. *Packard.* Half-hours with Insects, p. 183.
1882. Larva, (brief.) *Walsingham.* Trans. Amer. Entom. Soc., vol. 10, p. 187.
FOOD PLANT. *Pyrus.* (Oák-galls. Fitch.)

Nothris setosella. Clemens.
1872. Larva. *Chambers,* (as Yps. eupatoriella.) Canad. Entom., vol. 4, p. 221.
FOOD PLANT. *Eupatorium.*

Nothris trinotella. Coquillett.
1883. Larva. *Coquillett.* Papilio, vol. 3, p. 10.
FOOD PLANT. *Corylus.*

Nothris citrifoliella. Chambers.
1879. Larva. *J. H. Comstock.* Rept. U. S. Dept. Agr., p. 205.
1883. Larva, pupa. *Saunders.* Ins. Inj. Fruits, p. 382.
1885. Larva. *Hubbard,* (quotes Comstock.) Ins. Inj. Orange, p. 154.
FOOD PLANT. *Citrus.*

Blastobasis glandulella. Riley.
1872. Larva. *Riley.* Canad. Entom., vol. 4, p. 19.
1872. Larva, pupa, (figs.) *Riley.* 4th Missouri Rept., p. 144.
1881. Larva, (fig.) *Packard,* (quotes Riley.) Ins. Inj. Forest Trees, p. 53.
FEEDS in acorns.

Blastobasis citricolella. Chambers.
1879. Larva. *J. H. Comstock.* Rept. Dept. Agr., p. 206.
FEEDS in fruit of Orange.

Blastobasis coccivorella. Chambers.
1879. Larva. *J. H. Comstock.* Rept. U. S. Dept. Agr., p. 244.
FEEDS on insects of the family *Coccidæ.*

Litharlapteryx abroniella. Chambers.
1876. Larva. *Chambers.* Canad. Entom., vol. 8, p. 219.
FOOD PLANT. *Ambrosia fragrans.*

Butatis fuscicomella. Clemens.
1860. Egg. *Clemens.* Proc. Acad. Nat. Sc. Philad., May.
1872. Egg. *Clemens.* Tineina N. Amer. (Stainton), p. 126.

Butatis matutella (?). Clemens.
1874. Larva. *Chambers.* Canad. Entom., vol. 6, p. 9.
FOOD PLANTS. *Ambrosia, etc.*

Antispila viticordifoliella. Clemens.
1860. Larva. *Clemens.* Proc. Acad. Nat. Sc. Philad., June.
1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), p. 142.
1879. Case, (brief.) *Chambers.* Canad. Entom., vol. 11, p. 126.
1880. Larva. *Chambers.* Psyche, vol. 3, pp. 63, 149.
FOOD PLANT. *Vitis.*

Antispila isabella. Clemens.
1860. Larva. *Clemens.* Proc. Acad. Nat. Sc. Phila., June.
1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), p. 142.
1879. Case, (brief.) *Chambers.* Canad. Entom, vol 11, p. 126.
FOOD PLANT. *Vitis.*

Antispila nyssæfoliella. Clemens.
1860. Larva, cocoon. *Clemens.* Proc. Acad. Nat. Sc. Philad., January.

1872. Larva, cocoon. *Clemens.* Tineina N. Amer. (Stainton), pp. 20, 102.
1880. Larva. *Chambers.* Psyche, vol. 3, p. 63.
FOOD PLANT. *Nyssa multiflora.*

Antispila cornifoliella. Clemens.
1860. Larva. *Clemens.* Proc. Acad. Nat. Sc. Philad., January.
1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), p. 103.
1879. Case, (brief.) *Chambers.* Canad. Entom., vol. 11, p. 126.
1880. Larva. *Chambers.* Psyche, vol. 3, p. 149.
FOOD PLANT. *Cornus florida.*

Antispila ampelopsifoliella. Chambers.
1874. Larva. *Chambers.* Canad. Entom., vol. 6, p. 169.
1879. Case, (brief.) *Chambers.* Canad. Entom., vol. 11, p. 126.
1880. Larva. *Chambers.* Psyche, vol. 3, p. 149.
FOOD PLANT. *Ampelopsis.*

Antispila hydrangæella. Chambers.
1874. Larva. *Chambers.* Canad. Entom., vol. 6, p. 170.
1879. Case, (brief.) *Chambers.* Canad. Entom., vol. 11, p. 126.
FOOD PLANT. *Hydrangea nivea.*

Aspidisca juglandiella. Chambers.
1874. Larva. *Chambers.* Canad. Entom., vol. 6, p. 151.
FOOD PLANT. *Juglans.*

Aspidisca lucifluella. Clemens.
1860. Larva. *Clemens.* Proc. Acad. Nat. Sc. Philad., June.
1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), p. 143.
1879. Case, (fig.) *W. S. Barnard.* Proc. Ass. Adv. Sc., vol. 28, p. 476.
1880. Larva. *Chambers.* Psyche, vol. 3, p. 64.
FOOD PLANT. *Carya.*

Aspidisca saliciella. Chambers.
1861. Larva. *Clemens.* Proc. Acad. Nat. Sc. Philad., November.
1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), p. 171.
1880. Egg, larva. *Chambers.* Psyche, vol. 3, p. 147.
FOOD PLANT. *Salix.*

Aspidisca splendoriferella. Clemens.
1860. *Clemens.* Proc. Acad. Nat. Sc., Philad., January.
1861. Larva. *Clemens,* (as A. pruinella.) Proc. Acad. Nat. Sc. Philad., November.
1869. Larva, (brief.) *Packard,* (as L. saccatella.) Guide to Study of Ins., p. 355.
1871. Larva, case. *Chambers.* Canad. Entom., vol. 3, p. 223.
1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), pp. 105, 171.
1874. Larva. *Chambers.* Canad. Entom., vol. 6, p. 149.
1879. Case, (fig.) *W. S. Barnard.* Proc. Amer. Ass. Adv. Sc., vol. 28, p. 477.
1879. Larva, case, pupa, (figs.) *Comstock.* Rept. U. S. Dept. Agr., p. 210, pl. 2.
1883. Egg, larva, case, (figs.) *Saunders.* Ins. Inj. Fruits, pp. 116, 120.
FOOD PLANT. *Pyrus.*

Argyresthia undulatella. Chambers.
1880. Egg. *Chambers.* Psyche, vol. 3, p. 66.

Gracilaria stigmatella. Fabr.
1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths, vol. 2, p. 376.
1872. Larva. *Chambers,* (as G. purpuriella.) Canad. Entom., vol. 4, p. 28.
1881. Life history. *Chambers.* Canad. Entom., vol. 13, p. 25.
1886. Larva, pupa. *Packard,* (as G. purpuriella.) Rept. U. S. Dept. Agr., p. 333.
FOOD PLANTS. *Salix, Populus.*

Gracilaria salicifoliella. Chambers.
1872. Larva. *Chambers.* Canad. Entom., vol. 4, p. 26.
FOOD PLANT. *Salix.*

Gracilaria superbifrontella. Clemens.
1860. Larva. *Clemens.* Proc. Acad. Nat. Sc., Philad., January.
1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), p. 91.
FOOD PLANT. *Hamamelis.*

Gracilaria erigeronella. Chambers.
1872. Larva. *Chambers,* (as G. plantaginiella.) Canad. Entom., vol. 4, p. 11.
FOOD PLANTS. *Plantago, Erigeron.*

Gracilaria juglandisnigræella. Chambers.
1872. Larva. *Chambers.* Canad. Entom., vol. 4, p. 29.
FOOD PLANT. *Juglans.*

Gracilaria negundella. Chambers.
1880. Larva. *Chambers.* Psyche, vol. 3, p. 66.
FOOD PLANT. *Negundo.*

Gracilaria juglandella. Clemens.
1873. Larva. *Chambers.* Canad. Entom., vol. 5, p. 13.
FOOD PLANT. *Juglans.*

Gracilaria veustella. Clemens.
1873. Larva. *Chambers,* (as G. eupatoriella.) Canad. Entom., vol. 5, p. 46.
FOOD PLANT. *Eupatorium.*

Gracilaria lespedezæfoliella. Clemens.
1860. Larva. *Clemens.* Proc. Acad. Nat. Sc. Philad., June.
1863. Larva. *Clemens,* (as G. robiniella.) Proc. Entom. Soc. Philad., vol. 2, p. 4.
1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), pp. 145, 207.
1880. Larva, (brief.) *Chambers.* Amer. Entom., vol. 1, 2d ser., p. 61.
1881. Larva, (brief.) *Packard.* Ins. Inj. Forest Trees, p. 98.
FOOD PLANTS. *Lespedeza, Robinia.*

Ornix crataegifoliella. Clemens.
1860. Larva. *Clemens.* Proc. Acad. Nat. Sc. Philad., January.
1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), p. 94.
1873. Larva. *Chambers.* Canad. Entom., vol. 5, p. 49.
FOOD PLANT. *Crataegus tomentosa.*

Ornix geminatella. Packard.
1869. Larva, case, pupa, (figs.) *Packard,* (as Lithoc. gem.) Guide to Study of Ins., p. 353, pl. 8.
1877. Larva. *Packard.* Half-hours with Insects, p. 186.
1883. Larva, pupa, (figs.) *Saunders.* Ins. Inj. Fruits, p. 150.
FOOD PLANT. *Pyrus.*

Ornix quadripunctella. Clemens.
1861. Larva. *Clemens.* Proc. Entom. Soc. Philad., vol. 1, p. 86.
1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), p. 177.
FOOD PLANT. *Amelanchier canadensis.*

Ornix prunivorella. Chambers.
1873. Larva. *Chambers.* Canad. Entom., vol. 5, p. 50.
FOOD PLANT. *Prunus.*

Ornix inusitatumella. Chambers.
1873. Larva. *Chambers.* Canad. Entom., vol. 5, p. 48.
FOOD PLANT. *Cratægus.*

Coleophora malivorella. Riley.
1878. Larva, (fig.) *Riley.* Rept. U. S. Dept. Agr., p. 48.
1879. Larva, pupa, (fig.) *Lintner.* Rept. N. York State Agr. Soc., p. 52.
1880. Larva. *Coquillett,* (quotes Riley.) Trans. Dept. Agr. Ill., vol. 18, Append., p. 156.
1883. Egg, larva, case, pupa, (figs.) *Saunders.* Ins. Inj. Fruits, p. 115.
FOOD PLANT. *Pyrus malus.*

Coleophora vernoniella. Chambers.
1878. Larva, case. *Chambers.* Canad. Entom., vol. 10, p. 114.
FOOD PLANT. *Vernonia.*

Coleophora querciella. Clemens.
1861. Larva, case. *Clemens.* Proc. Entom. Soc. Philad., vol. 1, p. 80.
1872. Larva, case. *Clemens.* Tineina N. Amer. (Stainton), p. 168.
FOOD PLANT. *Quercus.*

Coleophora rosacella. Clemens.
1861. Larva, case. *Clemens.* Proc. Entom. Soc. Philad., vol. 2, p. 426.
1872. Larva, case. *Clemens.* Tineina N. Amer. (Stainton), p. 251.
FOOD PLANT. *Rosa.*

Coleophora rosæfoliella. Clemens.
1864. Larva, case. *Clemens.* Proc. Entom. Soc. Philad., vol. 2, p. 426.
1872. Larva, case. *Clemens.* Tineina N. Amer. (Stainton), p. 251.
FOOD PLANT. *Rosa.*

Coleophora caryæfoliella. Clemens.
1861. Larva, case. *Clemens.* Proc. Entom. Soc. Philad., vol. 1, p. 78.
1872. Larva, case. *Clemens.* Tineina N. Amer., p. 166.
1878. Larva, case. *Chambers.* Canad. Entom. vol. 10, p. 113.
FOOD PLANT. *Carya.*

Coleophora ostryæ. Clemens.
1861. Larva, case. *Clemens.* Proc. Entom. Soc. Philad., vol. 1, p. 79.
1872. Larva, case. *Clemens.* Tineina N. Amer. (Stainton), p. 167.
FOOD PLANT. *Ostrya virginica.*

Coleophora corylifoliella. Clemens.
1861. Larva, case. *Clemens.* Proc. Entom. Soc. Philad., vol. 1, p. 79.
1872. Larva, case. *Clemens.* Tineina N. Amer. (Stainton), p. 166.
FOOD PLANT. *Corylus.*

Coleophora tiliæfoliella. Clemens.
1861. Larva, case. *Clemens.* Proc. Entom. Soc. Philad., vol. 1, p. 80.
1872. Larva, case. *Clemens.* Tineina N. Amer. (Stainton), p. 168.
FOOD PLANT. *Tilia.*

Coleophora viburniella. Clemens.
1861. Larva, case. *Clemens.* Proc. Entom. Soc. Philad., vol. 1, p. 79.
1872. Larva, case. *Clemens.* Tineina N. Amer. (Stainton), p. 167.
FOOD PLANT. *Viburnum.*

Coleophora pruniella. Clemens.
1861. Larva, case. *Clemens.* Proc. Entom. Soc. Philad., vol. 1, p. 79.
1872. Larva, case. *Clemens.* Tineina N. Amer. (Stainton), p. 167.
FOOD PLANT. *Prunus.*

Coleophora glaucella. Walsingham.
1882. Case, (fig.) *Walsingham.* Trans. Entom. Soc. London, p. 433, pl. 17.
FOOD PLANT. *Arctostaphylos glauca.*

Coleophora viridicuprella. Walsingham.
1882. Case, (fig.) *Walsingham.* Trans. Entom. Soc. London, p. 432, pl. 17.
FOOD PLANTS. *Gramineæ, Juncus.*

Coleophora wyethiæ. Walsingham.
1882. Case, (fig.) *Walsingham.* Trans. Entom. Soc. London, p. 434, pl. 17.
FOOD PLANT. *Wyethia angustifolia.*

Coleophora discostriata. Walsingham.
1882. Case, (fig.) *Walsingham.* Trans. Entom. Soc. London, p. 435, pl. 17.
FOOD PLANT. *Quercus.*

Coleophora lynosyridella. Walsingham.
1882. Case, (fig.) *Walsingham.* Trans. Entom. Soc. London, p. 437, pl. 17.
FOOD PLANT. *Lynosoris viscidiflora.*

Coleophora castinipella. Walsingham.
1882. Case, (fig.) *Walsingham.* Trans. Entom. Soc. London, p. 441, pl. 17.
FOOD PLANT. *Salix.*

Coleophora rufolutrella. Chambers.

1882. Case, (fig.) *Walsingham.* Trans. Entom. Soc. London, p. 431, pl. 17.

FOOD PLANT. *Prunus americana.*

Coleophora cornella. Walsingham.

1882. Case, (fig.) *Walsingham.* Trans. Entom. Soc. London, p. 432, pl. 17.

FOOD PLANT. *Cornus pubescens.*

Coleophora viscidiflorella. Walsingham.

1882. Case, (fig.) *Walsingham.* Trans. Entom. Soc. London, p. 439, pl. 17.

FOOD PLANT. *Lynosyris viscidiflora.*

Coleophora octagonella. Walsingham.

1882. Case, (fig.) *Walsingham.* Trans. Entom. Soc. London, p. 431, pl. 17.

FOOD PLANT. *Persea carolinensis.*

Coleotechnites citriella. Chambers.

1879. Larva, case. *Comstock.* Rept. U. S. Dept. Agr., p. 206.

FOOD PLANT. *Citrus,* (Orange.)

Bedellia somnulentella. Zeller.

1859. Larva. *H. T. Stainton.* Brit. Butt. and Moths., vol. 2, p. 395.

1862. Life history. *Clemens.* Proc. Entom. Soc. Philad., vol. 1, p. 147.

1872. Life history. *Clemens.* Tineina N. Amer. (Stainton), p. 189.

FOOD PLANTS. *Convolvulus, Ipomea.*

Batrachedra salicipomella. Clemens.

1865. Life history. *Clemens,* (quotes Walsh in lit.) Proc. Entom. Soc. Philad., vol. 5, p. 143.

1872. Life history. *Clemens,* (quotes Walsh in lit.) Tineina N. Amer. (Stainton), p. 267.

FEEDS in galls of *Salix.*

Laverna gleditschiella. Chambers.

1876. Larva. *Chambers.* Canad. Entom., vol. 8, p. 137.

1880. Egg. *Chambers.* Psyche, vol. 3, p. 66.

FOOD PLANT. *Gleditschia.*

Laverna sabalella. Chambers.

1879. Larva, case, pupa, (fig.) *Comstock.* Rept. U. S. Dept. Agr., p. 209, pl. 2.

FOOD PLANT. *Palmetto.*

Laverna murtfeldtiella. Chambers.

1879. Larva, cocoon. *Chambers,* (quotes Miss Murtfeldt in lit.) Canad. Entom., vol. 11, p. 6.

FOOD PLANT. *Œnothera.*

Laverna cephalanthiella. Chambers.

1879. Larva, mine. *Chambers.* Canad. Entom., vol. 11, p. 7.

FOOD PLANT. *Cephalanthus.*

Laverna circumscriptella. Zeller.

1878. Larva. *Chambers,* (quotes Miss Murtfeldt in lit.) Canad. Entom., vol. 10, p. 239.

FOOD PLANT. *Œnothera.*

Walshia amorphella. Clemens.

1864. Larva, (brief.) *Clemens,* (quotes Walsh in lit.) Proc. Entom. Soc. Philad., vol. 2, p. 416.

1870. Larva, gall, (fig.) *Riley.* 2d Missouri Rept., p. 132.

1872. Larva, (brief.) *Clemens,* (quotes Walsh in lit.) Tineina N. Amer. (Stainton), p. 241.

FOOD PLANT. *Amorpha fruticosa,* (forming galls.)

Chrysocorys* erythriella. Clemens.

1860. Larva, cocoon, pupa. *Clemens.* Proc. Acad. Nat. Sc. Philad., May.

1872. Larva, cocoon, pupa. *Clemens.* Tineina N. Amer. (Stainton), p. 132.

FEEDS on racemes of *Rhus.*

*See also page 136.

Elachista brachyelytrifoliella. Clemens.
1864. Larva. *Clemens.* Proc. Entom. Soc. Philad., vol. 2, p. 425.
1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), p. 249.
FOOD PLANT. *Brachelytrum aristatum.*

Cycloplasis panicifoliella. Clemens.
1864. Larva. *Clemens.* Proc. Entom. Soc. Philad., vol. 2, p. 422.
1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), p. 248.
FOOD PLANT. *Panicum clandestinum.*

Aeaea ostryaella. Chambers.
1874. Larva. *Chambers.* Canad. Entom., vol. 6, p. 74.
FOOD PLANT. *Ostrya virginica.*

Aeaea purpuriella. Chambers.
1880. Larva. *Chambers.* Psyche, vol. 3, p. 64.
FOOD PLANT. *Robinia pseudacacia.*

Tischeria solidaginifoliella. Clemens.
1859. Pupa, cocoon. *Clemens.* Proc. Acad. Nat. Sc. Philad., November.
1872. Pupa, cocoon. *Clemens.* Tineina N. Amer. (Stainton), p. 81.
FOOD PLANT. *Solidago.*

Tischeria zelleriella. Clemens.
1859. Larva. *Clemens.* Proc. Acad. Nat. Sc. Philad., November.
1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), p. 81.
FOOD PLANT. *Quercus.*

Tischeria citrinipenella. Clemens.
1859. Larva. *Clemens.* Proc. Acad. Nat. Sc., Philad., November.
1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), p. 82.
FOOD PLANT. *Quercus.*

Tischeria fuscomarginella. Chambers.
1875. Mine. *Chambers.* Cincinnati Quart. Jour. Sc., vol. 2, p. 110.
FOOD PLANT. *Quercus alba.*

Tischeria tinctoriella. Chambers.
1875. Mine. *Chambers.* Cincinnati Quart. Jour. Sc., vol. 2, p. 108.
FOOD PLANT. *Castanea Americana.*

Tischeria badiella. Chambers.
1875. Mine. *Chambers.* Cincinnati Quart. Jour. Sc., vol. 2, p. 109.
FOOD PLANT. *Quercus alba.*

Tischeria quercivorella. Chambers.
1875. Mine. *Chambers.* Cincinnati Quart. Jour. Sc., vol. 2, p. 110.
FOOD PLANTS. *Quercus, nigra, etc.*

Tischeria castaneæella. Chambers.
1875. Mine. *Chambers.* Cincinnati Quart. Jour. Sc., vol. 2, p. 111.
FOOD PLANT. *Castanea americana.*

Tischeria ambrosiæella. Chambers.
1875. Mine. *Chambers.* Cincinnati Quart. Jour. Sc., vol. 2, p. 113.
FOOD PLANT. *Ambrosia.*

Tischeria heliopsisella. Chambers.
1875. Mine. *Chambers.* Cincinnati Quart. Jour. Sc., vol. 2, page 113.
FOOD PLANT. *Heliopsis lævis.*

Tischeria quercitella. Clemens.
1863. Larva, cocoon. *Clemens.* Proc. Entom. Soc., Philad., vol. 2, p. 13.
1872. Larva, cocoon. *Clemens.* Tineina N. Amer. (Stainton,) p. 221.
FOOD PLANT. *Quercus.*

Tischeria malifoliella. Clemens.
1860. Larva. *Clemens.* Proc. Acad. Nat. Sc. Philad., June.
1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), p. 141.
1883. Larva, pupa. *Saunders.* Ins. Inj. Fruits, p. 114.
FOOD PLANT. *Pyrus malus.*

Lithocolletis robiniella. Clemens.

1859. Larva, pupa. *Clemens.* Proc. Acad. Nat. Sc. Philad., November.
1871. Larva. *Chambers.* Canad. Entom., vol. 3, pp. 54, 86.
1872. Larva, pupa. *Clemens.* Tineina N. Amer. (Stainton), pp. 12, 66.
1880. Larva, (brief.) *Chambers.* Amer. Entom., vol. 1, 2d series, p. 61.
1881. Larva. *Packard,* (quotes Clemens.) Ins. Inj. Forest Trees, p. 99.
FOOD PLANT. *Robinia.*

Lithocolletis ulmella. Chambers.

1871. Larva. *Chambers.* Canad. Entom., vol. 3, p. 149.
FOOD PLANT. *Ulmus americana.*

Lithocolletis helianthivorella. Chambers.

1875. Mine. *Chambers.* Cincinnati Quart. Jour. Sc., vol. 2, p. 100.
FOOD PLANT. *Helianthus.*

Lithocolletis mariæella. Chambers.= **trifasciella.** Haworth. (?)

1875. Larva, pupa, cocoon. *Chambers.* Cincinnati Quart. Jour. Sc., vol. 2, p. 99.
FOOD PLANT. *Symphoricarpus vulgaris.*

Lithocolletis quercitella. Chambers.

1875. Larva, (brief.) *Chambers.* Cincinnati Quart. Jour. Sc., vol. 2, p. 102.
FOOD PLANT. *Quercus nigra.*

Lithocolletis albanotella. Chambers.

1875. Larva, (brief.) *Chambers.* Cincinnati Quart. Jour. Sc., vol. 2, p. 101.
FOOD PLANT. *Quercus nigra.*

Lithocolletis acerifella. Clemens.

1859. Larva, cocoon. *Clemens.* Proc. Acad. Nat. Sc. Philad., November.
1872. Larva, cocoon. *Clemens.* Tineina N. Amer. (Stainton), p. 75.
FOOD PLANTS. *Acer, Hamamelis.*

Lithocolletis guttifinitella. Clemens.

1859. Larva, cocoon. *Clemens.* Proc. Acad. Nat. Sc. Philad., November.
1872. Larva, cocoon. *Clemens.* Tineina N. Amer. (Stainton), p. 76.
FOOD PLANT. *Rhus toxicodendron.*

Lithocolletis pomifoliella. Zeller.= **cratægella.** Clemens.

1859. Larva. *Clemens.* Proc. Acad. Nat. Sc. Philad., November.
1860. Larva. *Clemens.* Proc. Acad. Nat. Sc. Philad., June.
1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), pp. 77, 141.
FOOD PLANTS. *Pyrus, Crataegus.*

Lithocolletis fitchella. Clemens.= **quercifoliella.** Fitch.

1859. Larva. *Fitch.* 5th Rept. Ins. N. York, p. 827.
1879. Larva, pupa. *Comstock.* Rept. U. S. Dept. Agr., p. 231.
1879. Mine. *Chambers.* Canad. Entom., vol. 11, p. 90.
1881. Larva. *Packard,* (quotes Comstock.) Ins. Inj. Forest Trees, p. 52.
FOOD PLANT. *Quercus.*

Lithocolletis hamadryadella. Clemens.

1859. Larva. *Clemens.* Proc. Acad. Nat. Sc. Philad., November.
1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), p. 77.
1879. Larva, cocoon, pupa, (figs.) *Comstock.* Rept. U. S. Dept. Agr., p. 226.
1881. Larva. *Packard,* (quotes Comstock.) Ins. Inj. Forest Trees, p. 51.
FOOD PLANT. *Quercus.*

Lithocolletis obscuricostella. Clemens.

1859. Pupa, (brief.) *Clemens.* Proc. Acad. Nat. Sc., Philad., November.
1872. Pupa, (brief.) *Clemens.* Tineina N. Amer. (Stainton), p. 71.
FOOD PLANT. *Ostrya virginica.*

Lithocolletis ostryæfoliella. Clemens.

1859. Larva. *Clemens.* Proc. Acad. Nat. Sc., Philad., November.
1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), p. 72.
1879. Mine, (brief.) *Chambers.* Canad. Entom., vol. 11, p. 91.
FOOD PLANT. *Ostrya virginica.*

Lithocolletis lucetiella. Clemens.

1859. Larva, cocoon. *Clemens.* Proc. Acad. Nat. Sc., Philad., November.
1872. Larva, cocoon. *Clemens.* Tineina N. Amer. (Stainton), p. 73.
FOOD PLANT. *Tilia americana.*

Lithocolletis obstrictella. Clemens.

1859. Larva. *Clemens.* Proc. Acad. Nat. Sc., Philad., November.
1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), p. 73.
FOOD PLANT. *Quercus.*

Lithocolletis caryæfoliella. Clemens.

1859. Larva. *Clemens.* Proc. Acad. Nat. Sc., Philad., November.
1861. Larva. *Clemens,* (as L. juglandiella.) Proc. Entom. Soc. Philad., vol. 1, p. 81.
1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), pp. 74, 170.
FOOD PLANT. *Carya.*

Lithocolletis tubiferella. Clemens.

1860. Larva. *Clemens.* Proc. Acad. Nat. Sc. Philad., June.
1872. *Clemens.* Tineina N. Amer. (Stainton), p. 140.
FOOD PLANT. *Quercus.*

Lithocolletis salicifoliella. Clemens.

1861. Larva. *Clemens.* Proc. Entom. Soc. Philad., vol. 1, p. 81.
1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), p. 169.
FOOD PLANT. *Salix.*

Lithocolletis ornatella. Chambers.

1880. Larva, (brief.) *Chambers.* Amer. Entom., vol. 1, 2d series, p. 60.
FOOD PLANT. *Robinia.*

Lithocolletis ambrosiæella. Chambers.

1871. Larva. *Chambers.* Canad. Entom., vol. 3, p. 127.
1875. Mine. *Chambers.* Cincinnati Quart. Jour. Sc., vol. 2, p. 101.
FOOD PLANT. *Ambrosia.*

Lithocolletis desmodiella. Clemens.

1859. Larva. *Clemens.* Proc. Acad. Nat. Sc. Philad., November.
1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), p. 68.
FOOD PLANT. *Desmodium.*

Lithocolletis lucidicostella. Clemens.

1859. Larva. *Clemens.* Proc. Acad. Nat. Sc. Philad., November.
1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), p. 66.
FOOD PLANT. *Acer saccharinum.*

Lithocolletis ceriferella. Clemens.

1859. Larva. *Clemens.* Proc. Acad. Nat. Sc. Philad., November.
1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), p. 69.
FOOD PLANT. *Quercus.*

Lithocolletis basistrigella. Clemens.

1859. Larva. *Clemens.* Proc. Acad. Nat. Sc. Philad., November.
1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), p. 69.
FOOD PLANT. *Quercus.*

Lithocolletis argentifimbriella. Clemens.

1859. Larva. *Clemens.* Proc. Acad. Nat. Sc. Philad., November.
1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), p. 70.
FOOD PLANT. *Quercus.*

Lithocolletis fuscocostella. Chambers.

1875. Larva, (brief.) Mine. *Chambers.* Cincinnati Quart. Jour. Sc., vol. 2, p. 102.
FOOD PLANT. *Quercus.*

Lithocolletis unifasciella. Chambers.

1875. Mine. *Chambers.* Cincinnati Quart. Jour. Sc., vol. 2, p. 103.
FOOD PLANT. *Quercus tinctoria.*

Lithocolletis castaneæella. Chambers.
1875. Larva, (brief.) *Chambers.* Cincinnati Quart. Jour. Sc., vol. 2, p. 104.
FOOD PLANT. *Castanea americana.*

Lithocolletis clemensella. Chambers.
1879. Mine, (brief.) *Chambers.* Canad. Entom., vol. 11, p. 91.
FOOD PLANT. *Acer.*

Lithocolletis cerealella.
1885. Egg, larva. *Fernald.* Kingsley's Stand. Nat. Hist., vol. 2, p. 440.

Lithocolletis gregariella. Murtfeldt.
1881. Larva, cocoon, pupa. *Mary E. Murtfeldt.* Canad. Entom., vol. 13, p. 246.
FOOD PLANT. *Phaseolus pauciflorus.*

Lithocolletis cincinnatiella. Chambers.
1871. Larva. *Chambers.* Canad. Entom., vol. 3, p. 147.
1877. Larva, (fig.) *Chambers.* Psyche, vol. 2, p. 83.
FOOD PLANT. *Quercus.*

Lithocolletis celtifoliella. *Chambers.*
1871. Larva. *Chambers.* Canad. Entom., vol. 3, p. 129.
FOOD PLANT. *Celtis.*

NOTE.—The five species next following were described by Dr. Fitch under the generic name of Argyromiges.

Lithocolletis querci-albella. Fitch.
1858. Larva. *Fitch.* 5th Rept. Ins. N. York, p. 828.
FOOD PLANT. *Quercus alba.*

Lithocolletis pseudacaciella. Fitch.
1858. Larva. *Fitch.* 5th Rept. Ins. N. York, p. 836.
FOOD PLANT. *Robinia.*

Lithocolletis uhlerella. Fitch.
1858. Larva. *Fitch.* 5th Rept. Ins. N. York, p. 836.
FOOD PLANT. *Robinia.*

Lithocolletis ostensackenella. Fitch.
1858. Larva. *Fitch.* 5th Rept. Ins. N. York, p. 838.
FOOD PLANT. *Robinia.*

Lithocolletis morrisella. Fitch.
1858. Larva. *Fitch.* 5th Rept. Ins. N. York, p. 838.
FOOD PLANT. *Robinia.*

Marmara salicitella. Clemens.
1863. Larva. *Clemens.* Proc. Entom. Soc. Philad., vol. 2, p. 7.
1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), p. 212.
FOOD PLANT. *Salix.*

Leucanthiza amphicarpeæfolielia. Clemens.
1859. Larva. *Clemens.* Proc. Acad. Nat. Sc. Philad., November.
1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), p. 85.
FOOD PLANT. *Amphicarpæa monoica.*

Phyllocnistis populiella. Chambers.
1875. Mine. *Chambers.* Cincinnati Quart. Jour. Sc., vol. 2, p. 106.
FOOD PLANT. *Populus.*

Phyllocnistis smilacicella. Chambers.
1875. Mine. *Chambers.* Cincinnati Quart. Jour. Sc., vol. 2, p. 107.
FOOD PLANT. *Smilax glabra.*

Phyllocnistis liquidambarisella. Chambers.
1875. Mine. *Chambers.* Cincinnati Quart. Jour. Sc., vol. 2, p. 106.
FOOD PLANT. *Liquidambar.*

Phyllocnistis ampelopsiella. Chambers.
1875. Mine. *Chambers.* Cincinnati Quart. Jour. Sc., vol. 2, p. 107.
FOOD PLANT. *Ampelopsis.*

Phyllocnistis liriodendronella. Clemens.

1863. Larva. *Clemens.* Proc. Entom. Soc. Philad., vol. 2, p. 13.
1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), p. 220.
FOOD PLANT. *Liriodendron tulipifera.*

Phyllocnistis vitigenella. Clemens.

1859. Larva. *Clemens.* Proc. Acad. Nat. Sc. Philad., November.
1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), pp. 25, 84.
FOOD PLANT. *Vitis cordifolia.*

Cemiostoma albella. Chambers.

1871. Larva, cocoon. *Chambers.* Canad. Entom., vol. 3, p. 24.
FOOD PLANT. *Populus.*

Bucculatrix pomifoliella. Clemens.

1860. Larva, cocoon. *Clemens.* Proc. Acad. Nat. Sc. Philad., June.
1872. Larva, cocoon. *Clemens.* Tineina N. Amer. (Stainton), p. 146.
1872. Larva, pupa, cocoon, (fig.) *Riley.* 4th Missouri Rept., p. 49.
1876. Larva. *G. H. Perkins,* (quotes Riley). 2d Rept. Vermont Board Agr., p. 597.
1880. Cocoon, (fig.) *Riley.* Amer. Entom., vol. 1, 2d series, p. 23.
1880. Larva, pupa. *Riley.* Amer. Entom., vol. 1, 2d series, p. 23.
1881. Larva. *Packard,* (quotes Clemens.) Ins. Inj. Forest Trees, p. 256.
1883. Larva, cocoon, (figs.) *Saunders.* Ins. Inj. Fruits, p. 118.
FOOD PLANTS. *Pyrus malus, Ambrosia.*

Bucculatrix thuiella. Packard.

1871. Larva, cocoon. *Packard.* Rept. Board Agr. Mass., p. 373.
1877. Larva, cocoon, (fig.) *Packard.* Half-hours with Insects, p. 187.
1881. Larva, cocoon, (fig.) *Packard.* Ins. Inj. Forest Trees, p. 256.
FOOD PLANT. *Thuja occidentalis.*

Bucculatrix trifasciella. Clemens.

1865. Cocoon. *Clemens.* Proc. Entom. Soc. Philad., vol. 5, p. 147.
1872. Cocoon. *Clemens.* Tineina N. Amer. (Stainton), p. 272.

Bucculatrix ambrosiæfoliella. Chambers.

1882. Larva. *Chambers.* Canad. Entom., vol. 14, p. 153.
FOOD PLANT. *Ambrosia.*

Nepticula sagianella. Clemens.

1861. Larva. *Clemens.* Proc. Entom. Soc. Philad., vol. 1, p. 85.
1865. Larva. *Clemens.* Proc. Entom. Soc. Philad., vol. 5, p. 146.
1872. Larva, cocoon. *Clemens.* Tineina N. Amer. (Stainton), pp. 175, 271.
FOOD PLANT. *Quercus.*

Nepticula platanella. Clemens.

1861. Larva. *Clemens.* Proc. Entom. Soc. Philad., vol. 1, p. 83.
1862. Larva. *Clemens.* Proc. Entom. Soc. Philad., vol. 1, p. 133.
1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), pp. 173, 192.
FOOD PLANT. *Platanus.*

Nepticula rubifoliella. Clemens.

1860. Larva, cocoon. *Clemens.* Proc. Acad. Nat. Sc. Philad., June.
1872. Larva, cocoon. *Clemens.* Tineina N. Amer. (Stainton), p. 152.
FOOD PLANT. *Rubus.*

Nepticula fuscotibiella. Clemens.

1880. Larva. *Chambers.* Psyche, vol. 3, p. 136.
FOOD PLANT. *Salix.*

Nepticula coryfoliella. *Clemens.*

1861. Larva. *Clemens.* Proc. Entom. Soc. Philad., vol. 1, p. 83.
1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), p. 172.
FOOD PLANT. *Corylus.*

Nepticula ostryæfoliella. Clemens.

1861. Larva. *Clemens.* Proc. Entom. Soc. Philad., vol. 1, p. 83.

1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), p. 172.
FOOD PLANT. *Ostrya virginica.*

Nepticula virginiella. Clemens.
1861. Larva. *Clemens.* Proc. Entom. Soc. Philad., vol. 1, p. 83.
1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), p. 172.
FOOD PLANT. *Ostrya virginica.*

Nepticula cratægifoliella. Clemens.
1861. Larva. *Clemens.* Proc. Entom. Soc. Philad., vol. 1, p. 83.
1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), p. 173.
FOOD PLANT. *Cratægus.*

Nepticula juglandifoliella. Clemens.
1861. Larva. *Clemens.* Proc. Entom. Soc. Philad., vol. 1, p. 84.
1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), p. 173.
FOOD PLANT. *Juglans.*

Nepticula caryæfoliella. Clemens.
1861. Larva. *Clemens.* Proc. Entom. Soc. Philad., vol. 1, p. 84.
1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), p. 174.
FOOD PLANT. *Carya.*

Nepticula villosella. Clemens.
1861. Larva. *Clemens.* Proc. Entom. Soc. Philad., vol. 1, p. 84.
1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), p. 174.
FOOD PLANT. *Rubus villosus.*

Nepticula amelanchierella. Clemens.
1861. Larva. *Clemens.* Proc. Entom. Soc. Philad., vol. 1, p. 84.
1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), p. 174.
FOOD PLANT. *Amelanchier canadensis.*

Nepticula (?) prunifoliella. Clemens.
1861. Mine. *Clemens.* Proc. Entom. Soc. Philad., vol. 1, p. 84.
1872. Mine. *Clemens.* Tineina N. Amer. (Stainton), p. 174.
FOOD PLANT. *Prunus.* Dr. Clemens thinks this mine may be the work of a dipterous insect.

Nepticula anguinella. Clemens.
1861. Larva. *Clemens.* Proc. Entom. Soc. Philad., vol. 1, p. 85.
1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), p. 175.
FOOD PLANT. *Quercus.*

Nepticula platea. Clemens.
1861. Larva. *Clemens.* Proc. Entom. Soc. Philad., vol. 1, p. 85.
1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), p. 175.
FOOD PLANT. *Quercus.*

Nepticula rosæfoliella. Clemens.
1861. Larva. *Clemens.* Proc. Entom. Soc. Philad., vol. 1, p. 85.
1872. Larva. *Clemens.* Tineina N. Amer. (Stainton), p. 176.
FOOD PLANT. *Rosa.*

Nepticula serotinæella. Chambers.
1873. Larva. *Chambers.* Canad. Entom., vol. 5, p. 126.
FOOD PLANT. *Prunus serotina.*

Nepticula nyssæfoliella. Clemens.
1880. Larva. *Chambers.* Psyche, vol. 3, p. 66.

Nepticula castaneæfoliella. Chambers.
1875. Mine. *Chambers.* Cincinnati Quart. Jour. Sc., vol. 2, p. 117.
FOOD PLANT. *Castanea americana.*

Nepticula ptiliacella. Chambers.
1880. Larva. *Chambers.* Psyche, vol. 3, p. 137.
FOOD PLANT. *Ptelia trifoliata.*

Micropteryx pomivorella. Packard.
1870. Larva. *Packard.* Inj. Ins., new or little known, p. 6.

1877. Larva, cocoon. *Packard.* Half-hours with Insects, p. 188.
FOOD PLANT. *Pyrus malus,* (Apple.)

NOTE.—There is considerable doubt as to the position of the two following genera, but as they are placed by many authors among the Tineidæ, I give the references to them.

Choreutes silphiella. Grote.
1881. Larva. *Grote,* (quotes Coquillett in lit.) Papilio, vol. 1, p. 40.
FOOD PLANT. *Silphium integrifolium.*

Brenthia pavonacella. Clemens.
1878. Larva, cocoon. *Chambers.* Canad. Entom., vol. 10, p. 76.
FOOD PLANT. *Amphicarpæa monoica.*

The three species of Tineidæ following were described by Dr. Clemens from the larva. The imagines are unknown.

Catastega timidella. Clemens.
1861. Larva. *Clemens.* Proc. Entom. Soc. Philad., vol. 1, p. 177.

Catastega hamameliella. *Clemens.*
1861. Larva. *Clemens.* Proc. Entom. Soc. Philad. vol. 1, p. 178.

Catastega aceriella. *Clemens.*
1861. Larva. *Clemens.* Proc. Entom. Soc. Philad., vol. 1, p. 178.

PTEROPHORIDÆ.

Chrysocorys* felicella. Walsingham.
1880. Larva, cocoon, pupa, (figs.) *Walsingham.* Pterop. Cal. Oregon, p. 3, pl. 1.
FOOD PLANT. *Orthocarpus.*

Platyptilus cardui. Zeller.
1869. Larva, pupa, (fig.) *Riley,* (as P. carduidactylus.) 1st Missouri Rept., p. 180.
1880. Larva, (brief.) *Walsingham.* Pterop. Cal. Oregon, p. 8.
1881. Larva, pupa, (brief.) *Kellicott.* Bull. Buffalo Soc. N. Hist., vol. 4, p. 47.
FOOD PLANT. *Cirsium lanceolatum.*

Platyptilus orthocarpi. Walsingham.
1880. Larva, (brief.) *Walsingham.* Pterop. Cal. Oregon, p. 12.
FOOD PLANT. *Orthocarpus.*

Oxyptilus periscelidactylus. Fitch, (Pterophorus of authors.)
1854. Larva, pupa. *Fitch.* 1st Rept. Ins. N. York, p. 140.
1856. Larva. *Fitch.* 3d Rept. Ins. N. York, p. 402.
1868. Larva. *Packard.* Amer. Naturalist, vol. 2, pp. 220, 333.
1869. Larva, pupa, (figs.) *Riley.* 1st Missouri Rept., p. 137.
1869. Larva, pupa, (figs.) *Packard.* Guide to Study of Ins., p. 356, pl. 8.
1871. Larva, pupa, (figs.) *Riley.* 3d Missouri Rept., p. 66.
1871. Larva, pupa, (figs.) *Saunders.* Rept. Entom. Soc. Ontario, p. 358.
1873. Larva, pupa, (figs.) *Saunders.* Canad. Entom., vol. 5, p. 99.
1877. Larva. *French.* Trans. Dept. Agr. Ill., vol. 15, p. 268.
1878. Larva, pupa, (figs.) *G. H. Perkins.* 5th Rept. Vermont Board Agr., p. 274.
1881. Larva. *W. W. Goldsmith,* (quotes Riley.) Kentucky Bureau Agr., p. 256.
1883. Larva, pupa, (figs.) *Saunders.* Ins. Inj. Fruits, p. 268.
1885. Larva. *Fernald.* Kingsley's Stand. N. Hist., vol. 2, p. 437.
FOOD PLANT. *Vitis.*

Oxyptilus nigrociliatus. Zeller.
1886. Pupa. *Packard.* Rept. U. S. Dept. Agr., p. 326.

Oedematophorus griscescens. Walsingham.
1880. Larva, (brief.) *Walsingham.* Pterop. Cal. Oregon, p. 35.
FOOD PLANT. *Artemisia.*

Oedematophorus cretidactylus. Fitch.
1881. Larva, pupa. *Kellicott.* Bull. Buffalo Soc. N. Hist., vol. 4, p. 49.
FOOD PLANT. *Eupatorium purpureum.*

*See also page 129.

Oedematophorus occidentalis. Walsingham.
1880. Larva, (brief.) *Walsingham.* Pterop. Cal. Oregon, p. 39.
FOOD PLANT. A species of Sunflower, (*Helianthus.*)

Oedematophorus inquinatus. Zeller.
1882. Larva. *Coquillett.* Papilio, vol. 2, p. 61.
FOOD PLANT. *Ambrosia.*

Oedematophorus ambrosiæ. Murtfeldt.
1880. Larva, pupa. *Mary E. Murtfeldt.* Amer. Entom., 2d ser., p. 236.
FOOD PLANT. *Ambrosia.*

Pterophorus monodactylus. Linn.
1880. Larva, (brief.) *Walsingham.* Pterop. Cal. Oregon, p. 40.

Lioptilus homodactylus. Walker.
1881. Larva, pupa. *Kellicott.* Bull. Buffalo Soc. N. Hist., vol. 4, p. 49.
1882. Larva, pupa. *Coquillett.* Papilio, vol. 2, p. 62.
FOOD PLANTS. *Eupatorium purpureum, Solidago.*

Lioptilus helianthi. Walsingham.
1880. Larva, (brief.) *Walsingham.* Pterop. Cal. Oregon, p. 54.
FOOD PLANT. Species of *Helianthus.*

Lioptilus sericidactylus. Murtfeldt.
1880. Larva, pupa. *Mary E. Murtfeldt.* Amer. Entom., vol. 1, 2d ser., p. 235.
FOOD PLANT. *Vernonia noveboracensis.*

Lioptilus kellicottii. Fish.
1881. Larva, pupa, (brief.) *Kellicott.* Bull. Buffalo Soc. N. Hist., vol. 4, p. 51.
FOOD PLANT. *Solidago.*

Aciptilus montanus. Walsingham.
1881. Larva, pupa. *Kellicott.* Bull. Buffalo Soc. N. Hist., vol. 4, p. 51.
FOOD PLANT. *Solidago.*

APPENDIX.

species not distinguishable by modern authors:

NOCTUIDÆ.

Hyperina hesperidago. Guen
1852 Larva Guen , after Abbot MS) Spec Gener. Noct. 3, p 393.
Food Plant *Quercus rubrum*

Hypogramma andromeda. Guen
1852 Larva, (cited fig) Guen , (after Abbot MS) Spec. Gener. Noct. 3, p. 2, pl 2
Food Plant *Andromeda arborea*

Mamestra typica L.
1865 Larva Buthaus Canad Entom , vol 1, p 87.
European species not known in N Amer)

GEOMETRIDÆ.

Endropia pultraria. Guen
1857 Larva Guen Spec Gener Phalaen , p 182

Geometra smaragdaria. Fab
1868 Larva Fitch 2d Rept Ins N York, p 381

For the information of students who may be interested in the [illegible] of our Lepidoptera, I give references to the following [illegible] papers, all of which are worthy of the most careful attention

Aaron, W V ..... The Cynthia's Worm Amer Naturalist, vol 2 1868
Food Plants of Geometridæ Entom Amer , vol 3, 1867.
Food Plants of various Lepidoptera, etc , Entom Amer , vols 1, 2, 3 1868-69
Packard, A S ..... Notes on Metamorphosis of Lepidoptera Larvæ, Proc Entom. Soc. Phil , vol 1 1861
Packard, A S ..... Notes on Amer Species of the genus Psyche vol 2 1877
Food Plants of Lepidoptera, Hall Geol survey (Hayden , vol 4, 1878
Habits of Leaf-mining Larvæ, Amer Entom , vol 1, 2d series, 1869
Metamorphosis of Larvæ of leaf-mining Larvæ, Amer Entom , vol 1, 2d series 1869
Packard, W H ..... Papers connected with Guild on Phycis pharam, Canad Entom , vol 9 1877
Papers connected with Guild on Chrysalis of Butterflies, Psyche, vol 3 1878
Habits of Larvæ of Genus Grapta Psyche vol 3
Habits of Food of Larvæ of Lepidoptera Psyche, vol 3
Packard, A S ..... Larva Variation Canad Entom vol 9 1877
Lawrence, J A ..... Description of Hybernia mana 26th Rept N York Cab N Hist 1873
Mann B P ..... Insect Larvæ of Lepidoptera Psyche vol 2 1877

APPENDIX.

Species not distinguishable by modern authors:

NOCTUIDÆ.

Hoporina hesperidago. Guen.

1856. Larva. *Guen.*, (after Abbot MS.) Spec. Gener. Noct. 3, p. 393.

FOOD PLANT. *Ostrya virginica.*

Hypogramma andromeda. Guen.

1856. Larva, (col'd fig.) *Guen.*, (after Abbot MS.) Spec. Gener. Noct. 3, p. 36, pl. 2.

FOOD PLANT. *Andromeda arborea.*

Nænia typica. L.

1869. Larva. *Bethune.* Canad. Entom., vol. 1, p. 87.

(European species not known in N. Amer.)

GEOMETRIDÆ.

Endropia pultraria. Guen.

1857. Larva. *Guen.* Spec. Gener. Phalaen., p. 132.

Geometra siccifolia. Fitch.

1856. Larva. *Fitch.* 3d Rept. Ins. N. York, p. 381.

For the information of students who may be interested in the transformations of our Lepidoptera, I give references to the following admirable papers, all of which are worthy of the most careful attention:

ANDREWS, W. V.....The Cynthia Silk-worm, Amer. Naturalist, vol. 2, 1868.

BRUCE, DAVID .....Food Plants of Geometridæ, Entom. Amer., vol. 3, 1887.

BEUTENMÜLLER, WM..Food Plants of various Bombyces, etc., Entom. Amer., vols. 1, 2, 3, 1886–88.

CLEMENS, B.....Notes on Micro-lepidopterous Larvæ, Proc. Entom. Soc. Philad., vol. 1, 1861.

CHAMBERS, V. T.....Notes on Amer. Species Lithocolletis, Psyche, vol. 2, 1877.

Food Plants of Tineidæ, Bull. Geol. Survey (Hayden), vol. 4, 1878.

Habits of Leaf-mining Larvæ, Amer. Entom., vol. 1, 2d series, 1880.

Mouth-parts and Legs of leaf-mining Larvæ, Amer. Entom., vol. 1, 2d series, 1880.

EDWARDS, W. H.....Experiments with Cold on Phyc. pharos, Canad. Entom., vol. 9, 1877.

Experiments with Cold on Chrysalis of Butterflies, Psyche, vol. 3, 1878.

Effects of Cold on Chrys. of Grapta, Psyche, vol. 3.

Effects of Cold on Larva of L. Disippus, Psyche, vol. 3.

GROTE, A. R.....Larval Variation, Canad. Entom., vol. 9, 1877.

LINTNER, J. A.....Biography of Hemileuca maia, 26th Rept. N. York Cab. N. Hist., 1872.

MANN, B. P.....Descrp. Larvæ of Lepidoptera, Psyche, vol. 2, 1877.

PACKARD, A. S.....Notes on Family Zygænidæ, Proc. Essex Inst., vol. 4, 1864.
Larva of Arctia caja., Changes of Skin, Entom. Mo., May, vol. 8, 1872.
Embryology of Lepidoptera, Amer. Naturalist, vol. 7, 1873.
Mode of Extrication of Moths from Cocoons, Amer. Naturalist, vol. 12, 1878.
RILEY, C. V.....Clover-hay Worm (Asopia costalis), 6th Missouri Rept., 1874.
Yucca Borer (Megathymus yuccæ), 8th Missouri Rept., 1876.
Pupation of Butterflies, Proc. Amer. Ass. Acad. Sc., vol. 28, 1879.
Canker-worms (their history, etc.), 3d Rept. U. S. Entom. Comm., 1880–82.
Cotton-worm and Army-worm, 4th Rept. U. S. Entom. Comm., 1884–85.
SAUNDERS, WM .....Hints on Describing Caterpillars, Canad. Entom., vol. 2, 1870.
SCUDDER, S. H .....Preservation of Caterpillars by Inflation, Amer. Naturalist, vol. 8, 1874.
Fragments of coarser Anatomy of Diurn. Lep., Psyche, vol. 3, 1881.
Pine Moth of Nantucket (Retinia frustrana), Mass. Soc. Promotion Agr., 1883.
TROUVELOT, L .....Life History of the Species of Silkworm Moths, Amer. Naturalist, vol. 1, 1867.
WALSH, B. D.....On Phytophagic Species and Varieties, Proc. Entom. Soc. Philad., vol. 3, 1864.

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SMITHSONIAN INSTITUTION.

UNITED STATES NATIONAL MUSEUM.

BULLETIN

OF THE

UNITED STATES NATIONAL MUSEUM.

No. 36.

CONTRIBUTIONS TO THE NATURAL HISTORY OF THE CETACEANS,
A REVIEW OF THE FAMILY DELPHINIDÆ.

BY

FREDERICK W. TRUE.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1889.

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ADVERTISEMENT.

The present publication (Bulletin No. 36) is the forty seventh of a series of papers intended to illustrate the collections belonging to the United States, and constituting the National Museum, of which the Smithsonian Institution was placed in charge by the act of Congress of August 10, 1846.

The publications of the National Museum consist of two series—the Bulletins, of which this is No. 36 in continuous series, and the Proceedings, of which the eleventh volume is now in press.

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S. P. LANGLEY,
Secretary of the Smithsonian Institution.

WASHINGTON, *February* 25, 1889.

CONTRIBUTIONS TO THE NATURAL HISTORY OF THE CETACEANS.

A REVIEW

OF THE

FAMILY DELPHINIDÆ.

BY

FREDERICK W. TRUE,

Curator of the Department of Mammals, United States National Museum.

WITH FORTY-SEVEN PLATES.

WASHINGTON:
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1889.

PREFACE.

More than four years ago the writer formed a determination to prepare a monograph of the species of Dolphins which occur on the coasts of North America. It immediately became apparent, however, that a proper comparison of the species described respectively by European and American naturalists could not be made without an examination of the types. A large proportion of the species of the family were established by Gray, whose descriptions are for the most part too brief and vague to serve as the basis of critical comparisons, while the descriptions of some other writers on the subject are almost equally insufficient.

Such being the condition of the literature, I resolved to visit the museums of Europe and to examine all the type specimens to which I could gain access. Professor Baird, the late Director of the Museum, very kindly consented to my being absent during the winter of 1883–'84, and I accordingly spent about four months in England and on the continent of Europe in the study of the specimens in question.

During this visit I became deeply indebted for courtesies shown me by the authorities of the different museums. I wish especially to acknowledge the kind attentions of Prof. William H. Flower, who not only gave me free access to the collections of the Royal College of Surgeons, which were at that time under his charge, but furnished me much valuable information, and, in addition, placed in my hands the proof-sheets of his then unpublished paper on the *Delphinidæ*, to which I shall have frequent occasion to refer in the following pages. Acknowledgment is also especially due to Dr. Albert Günther and Oldfield Thomas, esq., of the British Museum; Prof. J. W. Clarke, of Cambridge, and Prof. H. N. Moseley, of Oxford; Dr. George E. Dobson, of Netley; Thomas J. Moore, esq., of the Liverpool Free Public Museum; Thomas Southwell, esq., of the Norwich Museum; Prof. H. Paul Gervais and Prof. Paul Fischer, of the Muséum d'Histoire Naturelle, Paris; Dr. F. A. Jentinck, of the Leyden Museum; and Prof. P. J. Van Beneden, of Louvain.

In the course of my investigations I examined and measured the majority of the types of Gray, Cuvier, Gervais, Schlegel, and other English, French, and Dutch naturalists, together with numerous other specimens. Basing my opinions on the results of this study, I shall venture to pass in review the species of the different genera of the family, giving little attention to the genera themselves.

The genera *Orca* and *Orcella* are not touched upon in this paper. The species of the latter genus need no elucidation. In the case of *Orca*, the material which I gathered is scanty, and I abstain from discussing it for fear of adding to, rather than lessening, the confusion in which the genus is involved. Many additional facts must be obtained before even a tolerably satisfactory account of the killers can be written.

In conclusion it is necessary that I should say a few words regarding Professor Flower's paper "On the Characters and Divisions of the Family Delphinidæ" (Proc. Zool. Soc. London, 1883). As I have already stated, the proof-sheets of this valuable essay were very kindly placed in my hands by the author at the outset of my studies, and I have undoubtedly been influenced, to a great extent, by the opinions therein expressed. The grounds covered by this essay and my own, however, are somewhat different. Regarding his work, Professor Flower writes:

> It is, however, not so much to specific distinctions that this research has been directed, as to discover the mutual relations of the different modifications of the Dolphin type to one another, and their association into groups which may be considered (following the custom adopted in the arrangement of other groups) of generic value.*

My own work, on the contrary, has been directed not at all toward the distinction of genera, but rather toward the determination of species.

I have accepted the generic divisions employed by Professor Flower for the most part without alteration, as the basis of my work.

* Flower: Proc. Zool. Soc. London, 1883, p. 469.

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INTRODUCTION.

§ 1. Remarks upon the Distinction of Species and upon Subfamily Divisions.

The writer is fully aware that the time is not yet ripe for a final review of the family *Delphinidæ*. The work now accomplished must be regarded as provisional and subject to revision in the future.

Some of the great hindrances to the study of the dolphins—the scarcity of material, the ignorance of the limits of specific variation, and the like—have already been pointed out by Professor Flower, and it is not necessary that I should dwell upon these points. One other difficulty which is encountered by every student of the Cetacea arises from the incompleteness of the descriptions of species. In numerous cases only the external appearance of the species is described (and this from a single individual), the description being accompanied by one or two measurements, such as the total length or the greatest girth. In other instances, equally numerous, species are described from a single skull. It is evident that if this condition of affairs affected the entire family there would be two series of species: First, those founded on external appearance alone; and, second, those founded on osteological characters alone. Such a condition of affairs does, indeed, to a large extent prevail and has proved the cause of much confusion.

A naturalist can, however, scarcely be regarded as deserving censure for having described the skeleton of a species the external appearance of which is unknown to him. If the description is full and accurate it must be accepted, and cetologists must be content to wait patiently until the acquisitions of new specimens make a complete description possible.

Some writers, however, seeking to avoid the difficulty arising from this multiplication of names, have produced confusion in another way. Having come into the possession of fresh specimens, or of skeletons, accompanied by collectors' notes on the external appearance, they have identified the former with species insufficiently described by previous writers from external characters alone, and, without giving figures or measurements of the exterior, have proceeded to describe the skeleton. It is evident that a student approaching the subject at a later date has

only the author's bare statement that the external characters of the individual whose skeleton is described were identical with those of a previously-described species.

In the case of species founded upon single skulls, absolute certainty as to their distinctness can be reached only when large series of individuals known to be alike in their external and skeletal characters shall have been acquired. When such series shall be at command, the limits of specific variation can be determined with accuracy, and it will be possible to judge whether the characters held out as distinguishing the species in question are really of specific value or only represent such variations as are common among individuals of the same species. In the mean time it is only possible in many cases to form opinions which may or may not coincide with the truth.

In this, as in all other families of animals, an arrangement of the genera in a single linear series does violence to their natural affinities, while the attempt to introduce subfamily distinctions, with a view of approximating the arrangement more closely to a natural sequence, is here attended with great difficulties. Dr. Gill* has recognized four subfamilies: *Pontoporiinæ*, *Delphinapterinæ*, *Delphininæ*, and *Globiocephalinæ*. The genus *Pontoporia* (=*Pontoporiinæ*) I do not regard as belonging to the *Delphinidae*, and shall, therefore, omit all further reference to it. The *Globiocephalinæ* (=*Globicephalus* and *Grampus*) are characterized as having "digits (second and third) segmented into numerous phalanges," and to this are opposed the *Delphinapterinæ* and *Delphininæ*, which have "digits (second and third) not segmented into more than 5–6 phalanges each." The facts do not appear to warrant this distinction, since *Delphinus delphis* commonly has from seven to nine phalanges in the second digit, and *Tursiops tursio* and other species seven phalanges, which figures also represent the number of phalanges in the second digit of *Grampus*.

The character which Dr. Gill employs for the separation of the *Delphininæ* from the *Delphinapterinæ* seems to me to be of much greater importance. This relates to the condition of the cervical vertebræ. In *Monodon* and *Delphinapterus* (=*Delphinapterinæ*) the cervicals are all distinct, while in the other genera of the family they are more or less consolidated. I should be inclined, therefore, to unite Dr. Gill's *Delphininæ* and *Globiocephalinæ* under the former name, and to oppose to them the *Delphinapterinæ* as a second subfamily. I am the more inclined toward the adoption of this division on account of having discovered a character, which, in addition to that of the separate cervicals, is common to *Monodon* and *Delphinapterus*, but wanting in the other genera. This is that in the narwhal and white whale the pterygoid bones, instead of merely forming the walls of the posterior nares, extend rd in the form of broad plates across the optic canal and articu- h the squamosals.

*Gill. Arrangement of the Families of Mammals, 1872, p. 95.

This arrangement of parts is not to be found in other genera of the *Delphinidæ*, but is characteristic of the fluviatile dolphins (*Platanista*, etc.), to which indeed the *Delphinapterinæ* show many marks of affinity. Their separate cervical vertebræ, prolonged pterygoids, broad pectorals, and rudimentary dorsal fin, taken together, entitle them, I believe, to be regarded as a distinct subfamily. Elsewhere in the group I do not perceive that broad divisions are called for. Professor Flower employs provisionally the characters furnished by the shape of the head as a means of dividing the family into two groups. These characters, as Professor Flower himself admits, though useful and seemingly in accordance with natural affinities, within certain limits, are not trenchant.

The characters of the two divisions as regards the form of the head are as follows:*

a. With rounded head, without distinct rostrum or beak. (Among the genera included here are *Cephalorhynchus* and *Lagenorhynchus*.)

b. Dolphins with distinctly elongated rostrum, or beak, generally marked off from the antenarial adipose elevation by a V-shaped groove. (Comprises *Delphinus*, *Tursiops*, *Prodelphinus*, *Steno*, and *Sotalia*.)

Leaving *Monodon* and *Delphinapterus* out of consideration, this distinction is valid for the majority of the genera, but is broken down by *Lagenorhynchus* and *Cephalorhynchus*. In the former genus (included in section *a*) the beak, though shorter than in *Tursiops* (included in section *b*), is quite distinct and well marked off from the forehead, while in some species of *Cephalorhynchus* the head is certainly not "rounded" in the sense of being globose, but is conical.

The second character of the sections has to do with the length of the rostrum as compared with the total length of the skull. Here again *Lagenorhynchus* and *Cephalorhynchus* appear intermediate. *Cephalorhynchus eutropia* (section *a*) has the beak relatively as long as *Tursiops tursio* (section *b*); the same is also true for some species of *Lagenorhynchus*.

In spite of these considerations, however, I have employed these characters in the artificial keys to the genera, given on pages 152 and 153, believing them to be as useful, for that purpose at least, as any which can be formulated at present.

Among the supergeneric distinctions employed by Professor Flower is one which was brought into requisition for the first time and seems to be of value; this relates to the position of the two pterygoid bones. In a number of genera these bones meet in the median line of the palate, while in others they are widely separate. The value of this distinction is, however, diminished by the fact that in some species of *Lagenorhynchus* these bones are in contact, while in others they are widely divergent; also by the fact that the two positions appear to occur in some species, *e. g.*, *Sotalia gadamu*, as an individual variation. Within certain limitation, however, the character is apparently of much value.

* Characters and Divisions, pp. 504 and 511.

§ 2. Measurements.

At the beginning of my studies in the European museums I adopted a series of measurements which I applied uniformly to all specimens. It was not long before I perceived, however, that certain of them were of less value than others in the discrimination of species. I include them all in the tables in the hope that they may have value in some other connection.

The measurements are given uniformly in centimeters. The total length of the skull is measured from the center of a line joining the surfaces of the occipital condyles to the extremity of the rostrum. The length of the rostrum is obtained by measuring from the extremity of the same to the center of a line joining the bases of the maxillary notches. The orbital breadth is the distance between the centers (antero-posteriorly) of the margins of the orbits. The temporal fossæ being in most cases elliptical, the measurements of their length and breadth are made along their major and minor axes.

§ 3. Abbreviations.

There are a number of works upon the *Delphinidæ* to which I shall have need to refer so frequently in the succeeding pages that I have adopted for convenience certain abbreviations of their titles. These works are as follows:

Title.	Abbreviation.
J. E. Gray. Catalogue of Seals and Whales in the British Museum. 2d ed., London, 8°, 1866.	Catalogue.
J. E. Gray. Synopsis of the Species of Whales and Dolphins in the Collection of the British Museum. London, 4°, 1868.	Synopsis.
J. E. Gray. Supplement to the Catalogue of Seals and Whales in the British Museum. London, 8°, 1871.	Supplement.
Wm. H. Flower. On the Characters and Divisions of the Family *Delphinidæ*. Proceedings, Zoological Society of London, 1883, pp. 466–513.	Characters and Divisions.
Wm. H. Flower. List of the Specimens of Cetacea in the Zoological Department of the British Museum. London, 8°, 1885.	List.
Schlegel. Abhandlungen aus dem Gebiete der Zoologie und vergleichenden Anatomie. Leiden, 4°, 1841.	Abhandlungen.
Van Beneden et Gervais. Ostéographie des Cétacés vivant et fossiles. Paris, 4°, 1880.	Ostéographie.
P. Fischer. Cetacés du Sud-Ouest de la France. Actes de la Société Linnéenne de Bordeaux, xxxv, 1881, pp. 5–219, pl. i-viii.	Cétacés de France.

REVIEW OF THE SPECIES OF DOLPHINS.

SUBFAMILY I. DELPHININÆ.

1. SOTALIA Gray.

Sotalia Gray, Cat. Seals and Whales, Brit. Mus., Mod., 1866, p. 401. Synopsis, 1866, p. 6. Suppl. Cat. 1871, p. 67.

The type of this genus is the *Delphinus guianensis* of Van Beneden.

Of the characters assigned to the genus by Gray (l. c.) and by Professor Flower (Characters and Divisions, p. 51) only three seem to me of real value and distinguish it from *Turiops* and *Steno*. These are 1) the separation of the pterygoids; 2) the more limited number of the caudal vertebræ; and 3) the greater number of teeth. The somewhat unusual breadth of the base of the pectoral fin is shared by *Steno*. The unusual length of the symphysis of the mandible which has also been cited as a generic character seems to me of little value, since it is not shared by all the species. Although in *S. pseudesca*, *lentiginosa*, and *sinensis* the symphysis occupies about one third of the ramus of the mandible, in *S. tucuxi* and *guianensis* it occupies only about one fifth.

The genus, as already intimated, is very closely related to *Steno* and *Turiops*, both in its external form and its osteology. It shows some relationship, however, to *Phocæna*, *Inia*, and *Pontoporia* in the comparatively small number of its vertebræ and the length of their centra.

It would be necessary for me to treat of the species with much reserve were I debarred the opportunity of examining personally all the types and I have therefore based my opinions partly upon the descriptions and figures which have hitherto been published.

1. SOTALIA GUIANENSIS (Van Ben.).

Inia guianensis Van Ben., Nouv. Mém. Acad. Brux., xx, 1847, p. 17, pl. [illegible], figs. 1–3.

Steno guianensis Van Ben., Ann. Mus. Hist. Nat. Paris, xx, 1863, pp. 429 and [illegible].

The species was first treated of in Sir Richard Owen's memoir upon the Hunterian Museum. He mentions a series of drawings and a defective skull (No. 1677) which is now in the British Museum. The mandible which

bears the same number as this cranium (1477*b*) and was figured as belonging with the latter (Trans. Zool. Soc., VI, pl. 4), in reality belongs to a second and perfect cranium (1477*a*), which, although not mentioned by Sir Richard Owen, was apparently received with the type. This last-mentioned skull is wrongly labeled "No. 423. Type." A third skull (82: 1, 2, 3) is also in the collection. In the Cambridge Zoological Museum there is a fourth skull (573*a*) derived, according to the label, from Wollongong.

These four specimens agree well together; the Cambridge skull alone presents any important differences. The differences observable in this case relate to the comparative breadth of the skull and are very probably sexual. The pterygoids in specimens 1477*b* (type) and 1477*a* differ considerably in shape, but such variations are of frequent occurrence, and here at least, in my judgment, are not to be regarded as of specific value.

There are in the British Museum two stuffed skins of this species which though smaller than Sir Richard Owen's specimen agree well with it in proportions, except so far as regards the length of the pectoral fins. The following measurements taken from these skins are in right lines, except the distance from the extremity of the snout to the dorsal fin, in measuring which the curve of the back was followed:

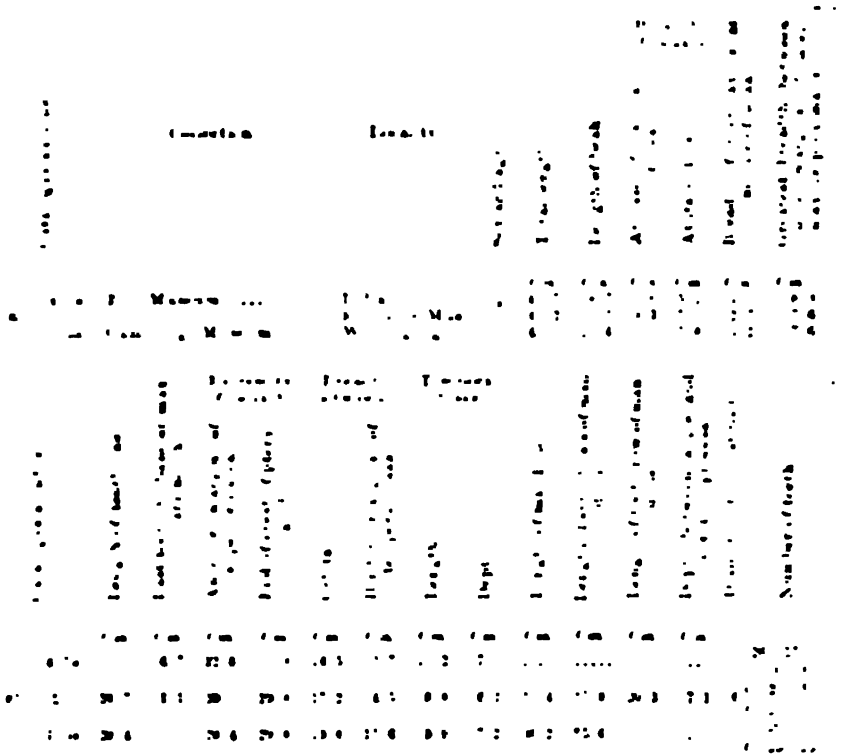
Measurements of two mounted skins of Sotalia gadamu.

Measurement.	British Museum.	
	No. 82: 1, 2, 3.	No. 83: 11, 20, 3.
	Inches.	*Inches.*
Total length	63.0	62.75
Tip of beak to corner of mouth	8.15	9.75
Tip of beak to eye	9.6	10.5
Tip of beak to elevation of head	3.95	4.0
Tip of beak to blowhole	10.30	10.75
Tip of beak to anterior base of pectoral fin	15.0	16.25
Tip of beak to anterior base of dorsal fin	28.0	27.8
Length of base of dorsal fin	9.0	19.0
Height of dorsal fin (vertical)	5.5	5.7
Length of pectoral fin (from anterior base)	10.75	.....
Breadth of flukes (tip to tip)	16.75	12.4
Greatest breadth of pectoral fin	4.0	3.65
Teeth (about)	.....	28–28 / 28–28

S. gadamu does not appear to be very closely related to the other species of the genus. The differences which separate it from *S. lentiginosus* will be considered in the section devoted to that species (p. 16). From *S. sinensis* and the South American species it differs widely as regards size of beak, number of teeth, etc., and the skeleton, when known, will probably show that similar differences extend to other parts of the body.

The skull shows decided affinities to *Tursiops*, from some species of which, were the pterygoids united, it would be very difficult to distinguish it.

Measurements of three skulls of Sotalia lentiginosus



SOTALIA LENTIGINOSA Owen.

Sotalia lentiginosa Owen, Trans. Zool. Soc. London, vol. [illegible], p. 30, [illegible].

Sotalia lentiginosa Flower, Proc. Zool. Soc. London, 1867, p. 4, pl. 1, fig. 11.

Two early specimens of this species which I found in the European museums are the type skull (1470a) which is numbered 1477 and a second Brazilian skull (1470c), all of which are in the British Museum. Sir Richard Owen showed his recognition of the true affinities of the species by placing it in Gray's genus Steno, which, at the time he wrote, included both species with hatchet-shaped teeth and those with separate conical teeth. He very properly separated the present species from S. tenuirostris in consideration of the real difference in the relative length of the two kinds of teeth, as well as other characters of the skull, apparently of less moment. Professor Flower, however, seems to doubt the distinctness of the two species. He writes:

"It is not easy to find characters by which the skulls of these two species may be distinguished, and I am not sure that the [illegible]."

The [illegible] expressed in the last clause of this sentence I do not share. In addition to the characters pointed out by Sir Richard Owen, viz., the

existence in *S. lentiginosa* of (1) a relatively longer beak, (2) flatter intermaxillæ (3) a longer tooth-row, and (4) more numerous teeth, I find (5) that the symphysis of the mandible is longer than in *S. gadamu*, (6) the temporal fossæ are larger, (7) the pterygoids are longer, and (8) the interorbital breadth less (see table of measurements below). The whole relative arrangement of the bones of the inferior surface of the skull differs in the two species.

In regard to external appearance, if the figures published by Sir Richard Owen are to be relied upon, the two species, *S. lentiginosa* and *S. gadamu*, are very different (T. Z. S., VI, 1866, pl. 3 (*S. gadamu*), pl. 5, figs. 2, 3 (*S. lentiginosa*). In addition to the difference in color and style of marking, the proportions of the pectoral fin, as presented both by the measurements and in the plates, are such as would alone suffice for the separation of the two species. The length of this member in *S. gadamu* is fully 22 per cent. of the entire length of the animal, while in *S. lentiginosa* the former length is less than 13 per cent. of the latter. Differences of almost equal magnitude exist in the proportions and relative positions of other members of the body. The value of these distinctions, however, would be greatly enhanced if we could be sure that the measurements were derived from the specimens themselves and not from the drawings. Unfortunately the intimation derived from the first paragraph of Sir Richard Owen's paper is that they were derived from the drawings. Even should such prove to be the case, the differences in the skulls remain, and these alone, in my estimation, are sufficient to warrant the separation of the species.

Measurements of the type skull of Sotalia lentiginosa.

Catalogue number.	Collection.	Type of—	Locality.	Sex and age.	Total length.	Length of beak.	Breadth of beak— At base of maxillary notches.	Breadth of beak— At its middle.	Breadth of intermaxillæ at middle of beak.	Greatest breadth between outer margins of intermaxillæ proximally.
					Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*
1476a	Brit. Museum.	*D. lentiginosus*..	Vizagapatam.	?	47.0	28.2	10.2	4.7	3.2	7.6

Catalogue number.	Length of tooth-line.	Last tooth to base of maxillary notch.	Extremity of beak to— Anterior margin of anterior nares.	Extremity of beak to— End of crest of pterygoid.	Breadth between— Orbits.	Breadth between— Hinder margins of temporal fossæ.	Temporal fossæ. Length.	Temporal fossæ. Depth.	Length of mandible.	Length of symphysis of mandible.	Length of tooth-row of mandible.	Depth between angle and coronoid process.	Diameter of largest tooth.	Number of teeth.
	Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*
1476a	25.3	3.8	31.7	34.9	17.4	14.7	10.2	8.0	39.9	12.1	23.9	7.9	0.43	34–34 33–34

* This is the extent of the rougose area, the real symphysis is about 5.3 cm.

REVIEW OF THE SPECIES OF DOLPHINS.

SUBFAMILY I. DELPHININÆ.

1. SOTALIA Gray.

Sotalia, Gray, Cat. Seals and Whales, Brit. Mus., 2d ed., 1866, p. 401; Synopsis, 1868, p. 6; Supplement, 1871, p. 67.

The type of this genus is the *Delphinus guianensis* of Van Beneden.

Of the characters assigned to the genus by Gray (l. c.) and by Professor Flower (Characters and Divisions, p. 513) only three seem to me of real value as distinguishing it from *Tursiops* and *Steno*. These are (1) the separation of the pterygoids; (2) the more limited number of the caudal vertebræ; and (3) the greater number of teeth. The somewhat unusual breadth of the base of the pectoral fin is shared by *Steno*. The unusual length of the symphysis of the mandible which has also been cited as a generic character seems to me of little value, since it is not shared by all the species. Although in *S. plumbeus*, *lentiginosus*, and *sinensis* the symphysis occupies about one-third of the ramus of the mandible, in *S. tucuxi* and *gadamu* it occupies only about one-fifth.

The genus, as already intimated, is very closely related to *Steno* and *Tursiops*, both in its external form and its osteology. It shows some relationship, however, to *Platanista*, *Inia*, and *Pontoporia* in the comparatively small number of its vertebræ and the length of their centra.

It will be necessary for me to treat of the species with much reserve since I did not have the opportunity of examining carefully all the types and must therefore base my opinions partly upon the descriptions and drawings which have hitherto been published.

SOTALIA GADAMU (Owen).

Delphinus (*Steno*) *gadamu*, Owen, Trans. Zool. Soc. London, VI, 1866, p. 17, pl. III, figs. 1–2.

Sotalia gadamu Flower, Proc. Zool. Soc. London, 1883, pp. 489 and 513.

This species is the first treated of in Sir Richard Owen's memoir upon the Indian cetacea. His material consisted of drawings and a defective skull (1477*b*) which is now in the British Museum. The mandible which

diminished by the fact that the specimen of *S. brasiliensis* is very young. The characters drawn out by M. Ed. Van Beneden are as follows:

Characters.	S. guianensis.	S. brasiliensis.
1. Size	greater.	smaller.
2. Number of vertebræ	55	54
3. Number of ribs (pairs)	12	11
4. Number of sternal ribs (pairs)	7	6
5. Number of pieces in sternum	3	1 (of bone); 1 (of cartilage).
6. Number of teeth	32 / — / 29	34 / — / 33
7. Ear-bones	smaller.	larger and peculiar.

On account of the immature condition of the specimen of *S. brasiliensis*, characters 1 and 5 are manifestly of little importance. The differences represented in characters 2, 3, and 6 are within the range of individual variation, as has been abundantly proved by the examination of various species. Characters 4 and 7, therefore—the number of sternal ribs and the size and form of the ear-bones—alone constitute recognizable distinctions between the two species. Of these two characters, the first is quite likely to be merely an individual difference; but the second can not of course be so considered.

Between *S. fluviatilis* and *S. pallida* the following distinctions are made:

Color—

S. fluviatilis: Body black above, rose-pink below; pectorals colored like the back.

S. pallida: Body fulvous above, white below; pectorals not colored like the back.

Pectoral fins—

S. fluviatilis: Quite large and pointed.

S. pallida: Smaller, less pointed, and narrower at the base.

Dorsal fin—

S. fluviatilis: Two-thirds as high as long.

S. pallida: Less high.

These distinctions are unsatisfactory, but can not be set aside without reason.

Between the five species we have but two points of comparison, the color of the body and the number of teeth. The data given by the different original describers are as follows:

S. brasiliensis—

Color: Back blackish, sides fulvous, belly white; pectoral like the back.

Teeth: $\frac{34}{33}$. (E. Van Beneden.)

S. guianensis—

Teeth: $\frac{32}{29}$. (E. Van Beneden.)

S. tucuxi—

Color: Darkish black or fuscous. Teeth: $\frac{30}{30}$. (Gray.)

S. fluviatilis—

Color: Above black, beneath rose-color; pectorals like the back. (Gervais.)

S. pallida—

Color: Above fulvous, beneath white; pectorals like the belly. Teeth: $\frac{30}{31}$. (Gervais.)

Measurements of three skulls of Sotalia gadamu.

Catalogue number.	Collection.	Locality.	Sex and age.	Total length.	Length of beak.	Breadth of beak— At base of maxillary notches.	Breadth of beak— At its middle.	Breadth of intermaxillæ at middle of beak.	Greatest breadth between outer margins of intermaxillæ proximally.
				Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*
1477*a*	Brit. Museum	India	♀	?47.7	?28.7	10.6	5.2	3.0	8.0
82. (1, 2, 3)	....do	Kurrachee Mus..	....	43.2	25.3	9.3	5.0	2.7	7.6
573*a*	Cambridge Museum.....	Wollongong	....	43.0	25.4	10.5	5.8	3.2	7.6

Catalogue number.	Length of tooth-line.	Last tooth to base of maxillary notch.	Extremity of beak to Anterior margin of superior nares.	Extremity of beak to End of crest of pterygoid.	Breadth between— Orbits.	Breadth between— Hinder margins of temporal fossæ.	Temporal fossæ. Length.	Temporal fossæ. Depth.	Length of mandible.	Length of symphysis of mandible.	Length of tooth-row of mandible.	Depth between angle and coronoid process.	Diameter of largest tooth.	Number of teeth.
	Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*		
1477*a*	.....	6.7	?32.8	?33.8	18.5	13.7	10.2	7.0	.....	.....	.....	.....	...	$\frac{26+25+}{?-?}$
82. (1, 2, 3)	20.7	5.1	29.0	29.8	17.2	14.5	8.8	6.3	35.4	*5.8	20.3	7.1	.6	$\left\{\frac{25-?}{25-25}\right.$
573*a*	20.4	.....	28.4	29.8	19.0	15.6	9.0	7.2	36.2	*5.6	.....	.....	...	$\left\{\frac{26-25}{25-25}\right.$

* This is the length of the symphysis proper; the length of the rugose area is about 11.7 cm.

SOTALIA LENTIGINOSA (Owen).

Delphinus (*Steno*) *lentiginosus*, Owen, Trans. Zool. Soc. London, VI, 1866, p. 20, pl. V, figs. 2 and 3.

Sotalia lentiginosus, Flower, Proc. Zool. Soc. London, 1883, p. 489 and 513.

The only specimens of this species which I found in the European collections are the type skull (1476*a*) with its mandible (1477*a*) and a second broken mandible (1476*a*), all of which are in the British Museum.

Sir Richard Owen showed his recognition of the true affinities of the species by placing it in Gray's genus *Steno*, which, at the time he wrote, included both species with united pterygoids and those with separate pterygoids. He very properly separated the present species from *S. gadamu*, in consideration of the difference in the relative length of the beak, the number of teeth, and some other characters of the skull, apparently of less moment. Professor Flower, however, seems to doubt the distinctness of the two species. He writes:

D. lentiginosus, Owen, from the same locality [as *S. gadamu*], described in the same memoir, is a closely allied species, if distinct. (*List*, p. 489.)

The doubt expressed in the last clause of this sentence I do not share. In addition to the differences pointed out by Sir Richard Owen, viz., the

existence in *S. lentiginosa* of (1) a relatively longer beak, (2) flatter intermaxillæ (3) a longer tooth-row, and (4) more numerous teeth, I find (5) that the symphysis of the mandible is longer than in *S. gadamu*, (6) the temporal fossæ are larger, (7) the pterygoids are longer, and (8) the interorbital breadth less (see table of measurements below). The whole relative arrangement of the bones of the inferior surface of the skull differs in the two species.

In regard to external appearance, if the figures published by Sir Richard Owen are to be relied upon, the two species, *S. lentiginosa* and *S. gadamu*, are very different (T. Z. S., VI, 1866, pl. 3 (*S. gadamu*), pl. 5, figs. 2, 3 (*S. lentiginosa*). In addition to the difference in color and style of marking, the proportions of the pectoral fin, as presented both by the measurements and in the plates, are such as would alone suffice for the separation of the two species. The length of this member in *S. gadamu* is fully 22 per cent. of the entire length of the animal, while in *S. lentiginosa* the former length is less than 13 per cent. of the latter. Differences of almost equal magnitude exist in the proportions and relative positions of other members of the body. The value of these distinctions, however, would be greatly enhanced if we could be sure that the measurements were derived from the specimens themselves and not from the drawings. Unfortunately the intimation derived from the first paragraph of Sir Richard Owen's paper is that they were derived from the drawings. Even should such prove to be the case, the differences in the skulls remain, and these alone, in my estimation, are sufficient to warrant the separation of the species.

Measurements of the type skull of Sotalia lentiginosa.

Catalogue number.	Collection.	Type of—	Locality.	Sex and age.	Total length.	Length of beak.	Breadth of beak—		Breadth of intermaxillæ at middle of beak.	Greatest breadth between outer margins of intermaxillæ proximally.
							At base of maxillary notches.	At its middle.		
1476*a*	Brit. Museum.	*D. lentiginosus*..	Vizagapatam.	?	*Cm.* 47.0	*Cm.* 28.2	*Cm.* 10.2	*Cm.* 4.7	*Cm.* 3.2	*Cm.* 7.6

Catalogue number.	Length of tooth-line.	Last tooth to base of maxillary notch.	Extremity of beak to—		Breadth between—		Temporal fossæ.		Length of mandible.	Length of symphysis of mandible.	Length of tooth-row of mandible.	Depth between angle and coronoid process.	Diameter of largest tooth.	Number of teeth.
			Anterior margin of superior nares.	End of crest of pterygoid.	Orbits.	Hinder margins of temporal fossæ.	Length.	Depth.						
	Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*
1476*a*	25.3	3.8	31.7	34.9	17.4	14.7	10.2	8.0	39.9	12.1	23.9	7.9	0.43	34–34 / 33–34

*This is the extent of the rougose area; the real symphysis is about 5.3 cm.

SOTALIA GUIANENSIS (Van Beneden).

Delphinus guianensis, Van Ben., Mém. Couron. Acad. Royale Belg., coll. in 8°, XVI, 1864, art. 2, 1 pl.

Sotalia guianensis, Gray, Cat. Seals and Whales, Brit. Mus., 1866, p. 401.

SOTALIA BRASILIENSIS E. Van Beneden.

Sotalia brasiliensis, E. Van Ben., Mém. Acad. Royale Belg., XLI, 1875, art. 1, pls. 1 and 2.

SOTALIA PALLIDA (Gervais).

Delphinus pallidus, Gervais, Castelnau Expéd. dans l'Amér. Sud, pt. VII, Zoologie, 1855, p. 94, pl. XIX, figs. 1–2.

Sotalia pallida, Van Ben. and Gervais, Ostéog. des Cétacés, 1880, p. 595.

SOTALIA TUCUXI (Gray).

Steno tucuxi, Gray, Ann. and Mag. Nat. Hist., 2d ser., XVIII, 1856, p. 158.

Sotalia tucuxi, Flower, Proc. Zool. Soc. London, 1883, p. 513.

SOTALIA FLUVIATILIS (Gervais).

Delphinus fluviatilis, Gervais, Bull. Soc. d'Agric. Hérault, XL, 1853, p. 148 (*sine descr.*).

Sotalia fluviatilis, Van Ben. and Gervais, Ostéog. des Cétacés, 1880, p. 596.

Of these five nominal species, one, *S. guianensis*, is from Cayenne; three from the Amazon River, *S. pallida*, *tucuxi*, and *fluviatilis;* and one, *S. brasiliensis*, from the bay of Rio de Janeiro. At least two skeletons of *S. guianensis* are to be found in the European collections and one of *S. brasiliensis*. The latter, however, is that of so young an animal as to make comparisons of little value. The description of *S. tucuxi* was drawn from two skulls in the British Museum. A skull of *S. fluviatilis* is said to be in the Paris Museum,* but is not figured by Van Beneden and Gervais in the Ostéographie.† These authors, however, figure and describe portions of a skeleton of *S. pallida*, also said to be in the Paris Museum.

Professor Flower justly remarks that the materials are not at present sufficient for the proper determination of these species. Nevertheless, several opinions have been advanced regarding them. M. Ed. Van Beneden has brought forward characters which he views as distinguishing *S. brasiliensis* from *S. guianensis*. The authors of the Ostéographie apparently held the same view, and at the same time united *S. fluviatilis* to *S. pallida*. Gray believed that *S. tucuxi* might also be identical with *S. pallida*, while Professor Flower finds it difficult to distinguish between these two species and *S. brasiliensis*.

It is only between *S. guianensis* and *S. brasiliensis* that comparisons of any moment have been made, and the value of these is unfortunately

* Mém. Acad. Belg., XLI, 1875, art. 1, p. 4.

† The references to the figures of *Sotalia* in this work are very confusing. The legend of plate XLI is as follows: "1–5, S. guyanensis. 6–17, S. pallida." In the "explication des planches," however, all the figures on this plate are placed under the heading of *S. guyanensis*, while in the text (p. 596) fig. 7 is referred to as *S. fluviatilis*.

diminished by the fact that the specimen of *S. brasiliensis* is very young. The characters drawn out by M. Ed. Van Beneden are as follows:

Characters.	S. guianensis.	S. brasiliensis.
1. Size	greater.	smaller.
2. Number of vertebræ	55	54
3. Number of ribs (pairs)	12	11
4. Number of sternal ribs (pairs)	7	6
5. Number of pieces in sternum	3	1 (of bone); 1 (of cartilage).
6. Number of teeth	32 / 29	34 / 33
7. Ear-bones	smaller.	larger and peculiar.

On account of the immature condition of the specimen of *S. brasiliensis*, characters 1 and 5 are manifestly of little importance. The differences represented in characters 2, 3, and 6 are within the range of individual variation, as has been abundantly proved by the examination of various species. Characters 4 and 7, therefore—the number of sternal ribs and the size and form of the ear-bones—alone constitute recognizable distinctions between the two species. Of these two characters, the first is quite likely to be merely an individual difference; but the second can not of course be so considered.

Between *S. fluviatilis* and *S. pallida* the following distinctions are made:

Color—

S. fluviatilis: Body black above, rose-pink below; pectorals colored like the back.

S. pallida: Body fulvous above, white below; pectorals not colored like the back.

Pectoral fins—

S. fluviatilis: Quite large and pointed.

S. pallida: Smaller, less pointed, and narrower at the base.

Dorsal fin—

S. fluviatilis: Two-thirds as high as long.

S. pallida: Less high.

These distinctions are unsatisfactory, but can not be set aside without reason.

Between the five species we have but two points of comparison, the color of the body and the number of teeth. The data given by the different original describers are as follows:

S. brasiliensis—

Color: Back blackish, sides fulvous, belly white; pectoral like the back.

Teeth: $\frac{34}{33}$. (E. Van Beneden.)

S. guianensis—

Teeth: $\frac{32}{29}$. (E. Van Beneden.)

S. tucuxi—

Color: Darkish black or fuscous. Teeth: $\frac{30}{30}$. (Gray.)

S. fluviatilis—

Color: Above black, beneath rose-color; pectorals like the back. (Gervais.)

S. pallida—

Color: Above fulvous, beneath white; pectorals like the belly. Teeth: $\frac{32}{?}$. (Gervais.)

Besides the original descriptions of the different species, we have Natterer's account of a specimen of river-dolphin harpooned at the mouth of the Rio Negro.* The specimen, which was a male, is represented as having been ashy-gray above and violet-gray below, with fins colored like the back. In coloration, therefore, it agreed tolerably well with *S. fluviatilis*. Natterer gives a number of measurements, but we have only the measurements of *S. brasiliensis* with which to compare them. From these it appears that the latter species has shorter pectoral fins, higher dorsal fin, and narrower flukes than had Natterer's specimen.

These differences give some strength to the opinion that the marine species, *S. brasiliensis* and *S. guianensis*, are distinct from the fresh-water species.

Von Pelzeln is inclined to support Gray's opinion that all the nominal river species are identical. He states, however, that Bates mentions *S. pallida* as occurring in the lower Amazon, which does not appear to be a fact. Bates's words are as follows:

> In the upper Amazons a third pale, flesh-colored species is also abundant (the *Delphinus pallidus* of Gervais).†

The species which he found at the mouth of the Tocantins River is the "*Steno tucuxi* of Gray."

In this unsatisfactory condition our knowledge is, unfortunately, likely to remain, until more material has been collected. The skeletons of a number of adult individuals, and observations upon the variation of the color and of the proportions of the pectoral and dorsal fins among members of the same school, are requisite to solve the problems which these five nominal species present.

Skulls Nos. 1189*a*, ♂, and 1189*b*, ♀ in the British Museum, the types of *S. tucuxi* are those of young animals, as is indicated by the exposure of a considerable portion of the frontal behind the maxilla and the distinctness of the occipito-parietal suture. The intermaxillæ are short proximally, and the maxillæ are visible on the anterior and lateral margins of the anterior nares. The ridge of the mesethmoid is higher than the triangular prenarial area in its middle part, and is thickened, forming a transverse ridge. The intermaxillæ are broadest and quite flat near the middle of the rostrum. The prenarial triangle is concave. The nasals are small in the male, and present only a thick upper edge.

The inner margins of the pterygoids in this specimen are separated at the extremity by an interval of about 28^{mm} and at the base are about 5^{mm} apart. The outline of these bones in the two sexes is somewhat different. The intermaxillæ and vomer appear in the median of the palate anteriorly in No. 1189 *a* for a distance of about 116^{mm}. The crowns of the teeth are tinged with brown, the roots are open. The ramus of the mandible is flat internally.

A skull recently purchased by the National Museum agrees very

* Brasilische Säugethiere. Resultate von Johann Natterer's Reisen in den Jahren 1817 bis 1835. Dargestellt von August von Pelzeln. Wien, 1883. Pp. 95-96.

† Bates, Naturalist on the Amazons, 1864, p. 88.

closely with these, but is larger, and evidently belonged to an older individual. The beak is relatively longer. I regard it identical with *S. tucuxi*, and have included it in the table of measurements under that name. It is said to have come from Florida, but the evidence is not entirely satisfactory. This skull also agrees well in proportions and details of structure with that figured by Van Beneden and Gervais under the name of *S. pallida* (Ostéographie, pl. XLI, fig. 6).

Van Beneden's measurements of the exterior and skull of his *S. brasiliensis* are appended for convenience of reference:

Measurements of Sotalia brasiliensis.

	Metres.
Exterior:	
Total length	1.21
Extremity of beak to eye	0.18
Eye to base of pectoral	0.14
Length of the base of the pectoral at its insertion	0.06
Pectoral to extremity of spinal column	0.82
Extremity of beak to base of pectoral	0.30
Vertical height of body in front of the dorsal	0.28
Greatest height of the tail	0.12
Length of the pectoral	0.155
Height of the dorsal	0.11
Total breadth of the flukes	0.32
Skull:	
Total length	0.305
Length of beak	0.165
Antero-posterior diameter of cranial cavity	0.100
Breadth of skull between temporal fossæ	0.130
Breadth at the zygomatic apophyses of temporal	0.136
Height of skull between the crest and the bason	0.110
Breadth of beak at last tooth	0.052
Height at same point	0.022
Height of foramen magnus	0.042
Greatest breadth of same	0.035
Breadth of one of the occipital condyles	0.022
Greatest diameter of condyle	0.038

For *S. fluviatilis*, Gervais gives only the following measurements:

	Metres.
Total length of body*	1.108
Greatest girth	0.70
Skull:	
Length of beak	0.20
Breadth of enlarged part preceding the beak	0.14
Length of mandible	0.270
Length of tooth row of same	0.165
Length of the symphysis	0.050

For *S. pallida* his measurements are as follows:

	M.
Length of body	1.65
Greatest girth	0.98
Skull:	
Total length	0.34
Enlarged part preceding the base of the beak	0.12

* Weight, 37.5 kilograms.

Measurements of three skulls of Sotalia tucuxi.

Catalogue number.	Collection.	Type of—	Locality.	Sex.	Total length.	Length of beak.	Breadth of beak—		Breadth of intermaxillary at middle of beak.	Greatest breadth between outer margins of intermaxillary proximally.
							At base of maxillary notches.	At its middle.		
					Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*
1189*a*	Brit. Mus.*.....	*Steno tucuxi* ..	Amazon River.	♀♂	30.9	17.1	6.3	13.5	†2.2	5.3
1189*b*	....do.*.....	....do	....do	♀♂	29.2	16.5	5.8	3.0	2.0	4.8
21499	U. S. Nat. Mus ..	.....	Florida (?)	....	35.3	20.8	7.1	4.1	2.4	5.5

Catalogue number.	Length of tooth-line.	Last tooth to base of maxillary notch.	Extent of beak to—		Breadth between—		Temporal fossæ—		Length of mandible.	Length of symphysis of mandible.	Length of tooth-row of mandible.	Depth between angle and coronoid process.	Diameter of largest tooth.	Number of teeth.
			Anterior margin of superior nares.	End of crest of pterygoid.	Orbits.	Hinder margins at temporal fossæ.	Length.	Depth.						
	Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*		
1189*a*	14.5	3.5	20.3	21.1	11.6	10.6	7.1	5.2	23.6	4.7	13.9	5.1	0.38	28—29 / 30—30
1188*b*	14.2	3.2	19.3	20.1	10.6	10.2	6.3	5.3	.....	.....	.....	.....	.....	.....
21499	18.3	3.5	24.4	25.2	12.9	11.1	7.4	6.1	29.7	6.3	.....	6.3	.....	31—33 / 32—30

* Collected by Bates. † The maxillæ have sprung apart.

SOTALIA PLUMBEA (Cuvier).

Delphinus plumbeus, Cuvier, Règne Animal, 2d ed., I, 1829, p. 283; Pucheran, Rev. et Mag. de Zool., 2d ser., VIII, 1856, pp. 145, 315, 362, 449.
Sotalia plumbeus, Flower, Proc. Zool. Soc. London, 1883, p. 513.
Steno plumbeus auct.

In the elaborate critique upon the relationships of this species published by Pucheran in 1856, the evidence upon which it was united to *D. malayanus*, Lesson, *D. dubius*, Cuvier, and other species, was very carefully sifted and the conclusion arrived at that it must be considered distinct and valid.

In its proportions and general appearance the type skull (*a*3053) resembles that of *S. lentiginosa*, but the differences are such that it can not be united with that form, at least upon the basis of the present scanty material. "*Delphinus plumbeus*, Dussumier," writes Professor Flower, "represents the longest and narrowest form of this type, with the most numerous teeth." (Characters and Divisions, p. 489). The beak is longer and more compressed than in *S. lentiginosa*, and the brain-case is decidedly narrower.

So far as external appearances are concerned there are apparently few points of resemblance between the two species. The depression and great extent of the dorsal fin, so strongly insisted upon by Pucheran as a character of *S. plumbea*, is not shared by *S. lentiginosa*, and the measurements do not agree. The color of the body of *S. plumbea* is described by F. Cuvier as being of "une teinte uniforme d'un gris plombé, excepté l'extrémité et le dessous de la mâchoire inférieure, qui sont blanchâtres."* The color of *S. lentiginosa*, according to Professor Owen, is "pretty uniformly bluish cinereous, or slaty, freckled with irregular small spots or streaks of brown or plumbeous pigment, the streaks longitudinal and flecked with white; the under surface is a shade lighter than the rest of the body."†

I think we may look upon the two species as distinct, and do not fear that future evidence will invalidate this conclusion.

Table of measurements of the type-skull of Sotalia plumbea.

Catalogue number.	Collection.	Type of—	Locality.	Age.	Total length.	Length of beak.	Breadth of beak— At base of maxillary notches.	Breadth of beak— At its middle.	Breath of intermaxillæ at middle of beak.	Greatest breadth between outer margins of intermaxillæ proximally.
					Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*
a3053	Mus. d'Hist. nat.‡	*S. plumbea*	Malabar	Ad.	55.9	34.9	11.2	4.3	2.8	8.4

Catalogue number.	Length of tooth-line.	Last tooth to base of maxillary notch.	Extremity of beak to— Anterior margin of superior nares.	Extremity of beak to— End of crest of pterygoid.	Breadth between— Orbits.	Breadth between— Hinder margins of temporal fossæ.	Temporal fossæ. Length.	Temporal fossæ. Depth.	Length of mandible.	Length of symphysis mandible.	Length of tooth-row of mandible.	Depth between angle and coronoid process.	Breadth of anterior nares.	Number of teeth.
	Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*		
a3053	31.0	5.1	40.0	41.9	19.2	13.5	11.2	8.6	47.0	15.0	.....	8.7	5.3	$\frac{37-37}{34-33}$

* Mammifères de la Ménagerie du Muséum, 60e livrasion. (*Fide* Pucheran.)

† Trans. Zool. Soc., London, VI, 1866, p. 20.

‡ Collected by Dussumier, 1837.

SOTALIA SINENSIS Flower.

Delphinus chinensis, Osbeck, Voyage to China in 1751, p. 12 (without description); Desmarest, Encycl. méthod. ("Mammalogie"), 1822, p. 514. (From Osbeck without description.)

Delphinus sinensis, F. Cuvier, Hist. nat. des Cétacés, 1836, p. 213. (From Osbeck without description.)

Delphinus sinensis, Flower, Trans. Zool. Soc. London, VII, 1870, p. 151.

Sotalia sinensis, Flower, Proc. Zool. Soc. London, 1883, p. 513.

This species, which from the time it was originally observed by Osbeck in 1751, stood among the forms *incertæ sedis*, was formally described by Professor Flower, in 1870, on the basis of two skeletons collected by Mr. Swinhoe in the harbor of Amoy. Although, through the kindness of Professor Flower, I was enabled to examine the types of the species, I can add nothing to his concise and sufficient account, and will simply quote the paragraphs in which the distinctive characters are set forth:

The principal differences between this skeleton and that of all other Dolphins lie in the vertebral column. The total number of vertebræ is less [viz: C. 7 D. 12, L. 10; Ca. 22=51], the individual vertebræ are proportionally longer, and their transverse processes are shorter and broader than in any other species. Next to it in these characters stands *D. guianensis* (genus *Sotalia*, Gray), which has the following vertebral formula: C. 7, D. 12, L 14, C. 22=55; then *D. tursio*, which has C. 7, D. 13, L. 17, C. 25=62.* 'The live animal is of a milky white, with pinkish fins and black eyes.'† The numbers of the teeth of the adult specimen of *D. sinensis*, as indicated by the alveoli, are $\frac{33-32}{32-31}$, total 128.‡

The localities in which the species is known or believed to occur are the harbor of Amoy, Canton River, and Foochow River.

A good figure of the exterior and measurements are still desiderata. Measurements of the skull are given in the synopsis.

2. STENO Gray.

<*Steno*, Gray, Zoology Erebus and Terror, 1846, p. 43; Cat. Cetacea Brit. Mus., 1850, p. 127; P. Z. S. London, 1864, p. 236; Cat. Seals and Whales Brit. Mus., 1866, p. 232; Supplement, 1871, p. 65; Van Beneden & Gervais, Ostéographie des Cétacés, 1880, p. 592.

><*Glyphidelphis*, Gervais, Zool. et Paleont. Franç., 1859, p. 301.

=*Steno*, Flower, Proc. Zool. Soc. London, 1883, p. 513.

Only three characters of importance have been brought forward as distinguishing this genus from its nearest ally, *Tursiops*. These relate to the (1) compression of the beak, (2) the elongation of the symphysis of the mandible, and (3) the rugosity of the teeth. The first two of these characters impress upon the mandible a peculiar form, which is widely different from that existing in *Tursiops*. The rami are concave

* Trans. Zool. Soc., London, VII, 1870, p. 159. The number of vertebræ in the genera *Monodon* and *Delphinapterus*, which is only 50, is not taken into consideration by Professor Flower in this connection. † Loc. cit., p. 152. ‡ Loc. cit., 155.

outward, and as the symphysis is not keeled the terminal portion of the mandible has the least depth, which is not the case in *Tursiops*. In the last-named genus the beak is depressed, while in *Steno* it is compressed. The teeth are equally numerous in the two genera, but in *Steno* the crown is rugose. As regards the vertebræ, the number in four regions of the body is practically alike in both genera, but, according to the measurements given by Dr. Peters for *S. perspicillatus*, the combined length of cervical vertebræ would appear to be considerably greater in *Steno* than in *Tursiops*.

From *Sotalia* the present genus is distinguished by its conjoined pterygoids and its less numerous and rugose teeth.

STENO ROSTRATUS (Desmarest).

Delphinus rostratus, Cuvier, Desmarest, Nouv. Dict. d'Hist. nat., IX, 1817, p. 160; Mammalogie, 1822, p. 515.

Delphinus rostratus, Shaw (?), Cuvier, Ann. du Muséum, XIX, 1812, p. 10.

Delphinus frontatus (pars), Cuvier, Oss. foss., 2d ed., V, 1823, p. 278. (*Fide* Flower.)

Delphinus rostratus, G. Cuvier, Règne Animal, 2 ed., I, 1829, p. 289; F. Cuv., in Oss. foss., 4th ed., 1836, p. 86, 121; Hist. nat. des Cétacés, 1836, p. 156.

Delphinus bredanensis, Cuv., Lesson, Hist. Nat. des Mammif. et Oiseaux découvert depius 1788, 1828, p. 206; Van Breda, Nieuwe Verhandl. Nederl. Inst., II, 1829, pp. 235–237, pls. 1, 2.

Delphinorhynchus bredanensis, Lesson, Hist. Nat. des Mammif. et Oiseaux découvert depuis 1788, 1828, p. 441 (table méthod.).

Steno rostratus and *S. frontatus*, Gray, Zool. Erebus and Terror, 1846, p. 43.

Steno frontatus, Gray, Synop. Whales and Dolphins, 1868, p. 5.

Glyphidelphis rostratus, Gervais, Zool. and Paleon. Franç., 1859, p. 301; Ostéog. des Cétacés, 1880, p. 594, pl. XXXVII, figs. 8–11.

Delphinus planiceps, Schlegel, Abhandl. aus d. Geb. Zoologie, heft I, 1841, p. 27 (*not* Van Breda).

Steno compressus, Gray, Zool. Erebus and Terror, 1846, p. 43, pl. 27.

Delphinus Reinwardtii, Schlegel, Abhandl. Geb. Zool., heft I, 1841, p. 27, pl. 3, figs. 2, 3.

Delphinus Pernettyi, Desmarest, Mammalogie, 1822, p. 513.

The peculiar synonymy of this species has received thorough treatment at the hands of Professor Flower (Charac. and Div., p. 482 *et seq.*), to whose account I can add but little. He has, however, fallen into the same error as Schlegel in accrediting the name *D. planiceps* to Van Breda. The latter writer used the name of *D. bredanensis* for the species, which name, according to his own account, he took from Les son's *Histoire naturelle des Mammifères decouvert depuis* 1788.

Desmarest credits the name *D. rostratus* to G. Cuvier, but incorrectly it appears, for Cuvier simply states that his specimens belong possibly to Shaw's *Delphinus rostratus*. It appears to me, therefore, that Des- name should be appended to the name of the species instead of

reda appears to have published his account of the species, e name of *D. bredanensis*, before Cuvier had recognized that

the stuffed skins which had been associated with the skulls in the Paris Museum did not belong to the same species. When Cuvier recognized the latter fact he at the same time arrived at the conclusion that Van Breda's specimen was specifically identical with the skulls in the Paris Museum. He also received from Brest a figure of a specimen which seemed to him identical with Van Breda's (*Oss. foss.*, 4th ed., VIII, pt. 2, p. 122, note). Van Breda's figure and the figure of the Brest specimen (copied by F. Cuvier), therefore, represent the exterior of the species under discussion according to Cuvier's best knowledge and belief.

In accepting his opinion, however, we meet at once with a serious difficulty. The figures referred to represent a dolphin having the beak confluent with the forehead, a point strongly insisted upon by G. Cuvier and again by F. Cuvier. But in 1876 Peters described a specimen of *Steno* the skull of which is, generically at least, identical with the skulls in the Paris Museum, but which has the beak distinctly marked off from the forehead as in the species of *Tursiops* and *Delphinus*. We have, therefore, either to consider the figures known to Cuvier incorrect, or to regard Peters' specimen as belonging to a distinct subgenus. From this dilemma nothing thus far known can save us. The figures in question are crude, but it seems scarcely probable that both would have the same defect as regards the beak. Regarding the *Steno perspicillatus* of Peters, Professor Flower says:

> If it is not specifically identical with, it is certainly very closely allied to *Steno rostratus*. (*Characters and Divisions*, p. 486.)

I examined the type-skull in 1887, through the kindness of Dr. Hilgendorf, and was unable to see wherein it differed from the ordinary *S. rostratus*. The rostrum, as indicated in Peters' figure, is rather abruptly and unsymmetrically terminated, as though the tip had been cut off. Such, however, does not appear to have been the case, and it is possible that the individual was injured by accident during life. This condition of the rostrum makes it appear that its proportional width at the middle is unusually great; according to my measurements it is 19.8 per cent. of the length. But with the explanation given I do not think that this is to be regarded as of importance. The teeth are rugose, as in ordinary specimens of *S. rostratus;* they number $\frac{24-23}{22-21}$. The premaxillæ are high, thick, and rounded.

In external form and coloration there is a close resemblance to *Tursiops tursio*, except that a dark eye-ring and forehead-line are present, as in *D. delphis*. The cervical region is longer than in *Tursiops*, but the number of vertebræ is nearly the same in both.

The facts being such as they are, it has seemed to me best to hold Peters' specimen apart, under the name of *Steno perspicillatus*, and I have, therefore, entered that species separately in the synopsis. For further remarks on the figures known to Cuvier, see p. 27.

In Cuvier's original description (Ann. du Muséum, XIX, 1812, p. 9) no single skull is mentioned, and the species, therefore, has no type. The description, however, and the figure afterwards published in the *Ossements fossiles*, would suffice for the recognition of the species were it not that others were subsequently erected on skulls closely resembling that figured by Cuvier.

The characters which have been insisted upon as separating the different species relate to the width of the beak and the number of teeth. In the first of these characters, as Professor Flower has already intimated, there is a complete gradation. The following table shows the gradation in twenty-six specimens in European museums, including the type of *S. compressus* and probably also of *S. reinwardtii*:

Comparison of the length of the beak in S. compressus, etc., taken at 100 per cent., with its width at the middle.

Collection.	Number.	Identification.	Proportional width of beak at middle.	Length of skull.	Greatest number of teeth—	
					Upper jaw.	Lower jaw.
			Per cent.	*Inches.*		
1. Leiden	24	Reinwardtii (†Type)	11.5	20.47	25	25
2. Liverpool	7, 7, 66, 31		12.0	21.0	24	24
3. Paris	*a* 3047	Rostratus	12.2	19.5	22	22
4. London (B. M.)	346 *b*	Compressus	12.6	20.5	22	24
5. London (B. M.)	346 *a*	Compressus (Type)	12.9	20.125	25	27
6. Liverpool	24, 2, 63		13.2	21.25	25	24
7. Leiden	26	Planiceps	13.3	19.92	24	25
8. Oxford	X[5] (juv.)	Rostratus	13.5	19.4	23	24
9. Oxford	1668	Rostratus	14.3	20.2	24	25
10. Liverpool	19, 11, 62		14.3	21.4	22	23
11. Liverpool	13, 11, 68, 1		14.5	20.25	23	24
12. Liverpool	*a*		14.7	21.4	23	23
13. London (B. M.)	346 *d*	Compressus	15.5	20.125	22	20
14. Leiden	None (1)	†Planiceps	15.6	19.68	21	23
15. Leiden	None (2)	†Planiceps	15.8	20.79	21	24
16. Oxford	1676	Rostratus	15.8	20.0	22	22
17. Liverpool	23, 1, 64, 2		15.8	20.25	22	21
18. Leiden	27	†Planiceps	16.2	19.2	21	22
19. Liverpool	21, 5, 62, 1		16.4	21.75	20	21
20. London (B. M.)	245 *d*	Frontatus	16.5	20.375	22	22
21. Liverpool	12, 7, 69, 1		16.9	20.6	21	21
22. London (B. M.)	245 *c*	Frontatus	17.4	20.125	23	22
23. Liverpool	24, 3, 59, 2		18.1	20.85	23	23
24. Liverpool	7, 2, 70, 63		18.7	20.0	23	23
25. Leiden	30	Planiceps	18.8	21.06	21	24
26. Norwich		Frontatus	†21.0	19.2		

A gradation so complete as this evidently renders any character drawn from the proportions of the rostrum useless as an index of specific distinctness, and, unless others can be brought forward, the separation of the skulls into different species is, of course, unwarranted.

The slight variation in the number of teeth has no significance, as the table plainly shows. In all species of dolphins, as a general rule, the individuals having the longest rostrums have the greatest number of teeth.

In Cuvier's figure of the skull of *D. rostratus* (*Oss. foss.*, 4th ed., 1836, pl. 222, fig. 7) the breadth of the rostrum at the middle is 19.1 per cent.

[illegible] makes this a very broad-beaked specimen. More [illegible] teeth, however, are not always to be relied upon. In the description Cuvier gives the number of teeth as [illegible], while the [illegible] 24 in the left side of the upper jaw and 24 in the lower [illegible]. No. 3017 in the Paris Museum, labelled *S. rostratus*, and also [illegible], belongs to the opposite end of the series. The breadth of the snout at the nostrils is but 12·2 per cent. of its length. This was [illegible] one of the specimens already in the museum in Cuvier's time.

Steno compressus Gray.

The type of this species, No. 2461 of the British Museum, is a skull with a tolerably narrow rostrum and rather numerous teeth, but appears [illegible] other characters serving to distinguish it from the skulls [illegible] Paris Museum and in other collections. It is improbable, therefore, that it represents a distinct species.

Delphinus rostratus Schlegel.

The type of this species appears to be No. 24 of the Leyden Museum. It is a large skull with a long narrow rostrum and a rather large [illegible] of teeth (?). It does not differ from the skulls which Gray [illegible], or, in other words, is a narrow-beaked individual of [illegible].

Delphinus Delfrancii Van Breda.

As already noted, Van Breda described this species before Cuvier [illegible] and that the skulls generally ascribed to *S. rostratus* were [illegible] species. Van Breda perceived that these skulls were [illegible] from that of his specimen, but considered that they were [illegible] with the species very different, generally, as to proportions [illegible]. Van Beneden's figure, however, convinced Gervais that [illegible], and described it [illegible] as representing the [illegible] *Delfrancii* and *rostratus*.

Steno frontatus Gray.

[illegible]

[illegible]

[illegible]

[illegible]

In Cuvier's original description (Ann. du Muséum, XIX, 1812, p. 9) no single skull is mentioned, and the species, therefore, has no type. The description, however, and the figure afterwards published in the *Ossements fossiles*, would suffice for the recognition of the species were it not that others were subsequently erected on skulls closely resembling that figured by Cuvier.

The characters which have been insisted upon as separating the different species relate to the width of the beak and the number of teeth. In the first of these characters, as Professor Flower has already intimated, there is a complete gradation. The following table shows the gradation in twenty-six specimens in European museums, including the type of *S. compressus* and probably also of *S. reinwardtii:*

Comparison of the length of the beak in S. compressus, etc., taken at 100 per cent., with its width at the middle.

Collection.	Number.	Identification.	Proportional width of beak at middle.	Length of skull.	Greatest number of teeth—	
					Upper jaw.	Lower jaw.
			Per cent.	*Inches.*		
1. Leiden	24	Reinwardtii (?Type)	11.5	20.47	25	25
2. Liverpool	7, 7, 66, 31		12.0	21.0	24	24
3. Paris	*a* 3047	Rostratus	12.2	19.5	22	22
4. London (B. M.)	346 *b*	Compressus	12.6	20.5	22	24
5. London (B. M.)	346 *a*	Compressus (Type)	12.9	20.125	25	27
6. Liverpool	24, 2, 63		13.2	21.25	25	24
7. Leiden	26	Planiceps	13.3	19.92	24	25
8. Oxford	X[s] (juv.)	Rostratus	13.5	19.4	23	24
9. Oxford	1668	Rostratus	14.3	20.2	24	25
10. Liverpool	19, 11, 62		14.3	21.4	22	23
11. Liverpool	13, 11, 68, 1		14.5	20.25	23	24
12. Liverpool	*a*		14.7	21.4	23	23
13. London (B. M.)	346 *d*	Compressus	15.5	20.125	22	20
14. Leiden	None (1)	?Planiceps	15.6	19.68	21	23
15. Leiden	None (2)	?Planiceps	15.8	20.79	21	24
16. Oxford	1676	Rostratus	15.8	20.0	22	22
17. Liverpool	23, 1, 64, 2		15.8	20.25	22	21
18. Leiden	27	?Planiceps	16.2	19.2	21	22
19. Liverpool	21, 5, 62, 1		16.4	21.75	20	21
20. London (B. M.)	245 *d*	Frontatus	16.5	20.375	22	22
21. Liverpool	12, 7, 69, 1		16.9	20.6	21	21
22. London (B. M.)	245 *c*	Frontatus	17.4	20.125	23	22
23. Liverpool	24, 3, 59, 2		18.1	20.85	23	23
24. Liverpool	7, 2, 70, 63		18.7	20.0	23	23
25. Leiden	30	Planiceps	18.8	21.06	21	24
26. Norwich		Frontatus	?21.0	19.2		

A gradation so complete as this evidently renders any character drawn from the proportions of the rostrum useless as an index of specific distinctness, and, unless others can be brought forward, the separation of the skulls into different species is, of course, unwarranted.

The slight variation in the number of teeth has no significance, as the table plainly shows. In all species of dolphins, as a general rule, the individuals having the longest rostrums have the greatest number of teeth.

In Cuvier's figure of the skull of *D. rostratus* (*Oss. foss.*, 4th ed., 1836, pl. 222, fig. 7) the breadth of the rostrum at the middle is 19.1 per cent.

[illegible] makes this a very broad-based species. Measurements from figures, however, are not always to be relied upon. In the description Cuvier gives the number of teeth as [illegible], while the figure shows 21 in the left half of the upper jaw and 24 in the lower jaw. No. 1907 in the Paris Museum, labeled *Steno rostratus*, and also [illegible], belongs to the *Sotalia* section of the genus. The breadth of the rostrum at the middle is but 12.2 per cent. of its length. This was probably one of the specimens already in the museum in Cuvier's time.

Steno compressus Gray.

The type of this species, No. 2161 of the British Museum, is a small skull with a relatively narrow rostrum and rather numerous teeth, but appears to lack most of the characters serving to distinguish it from the skulls in the Paris Museum and in other collections. It is improbable, therefore, that it represents a distinct species.

Delphinus rostratus Schlegel.

The type of this species is apparently the No. 24 of the Leyden Museum. It is a large skull with a long, narrow rostrum and a rather large number of teeth (44). It is separated under from the skulls which Gray referred to *Steno rostratus*, or, in other words, to a narrow-beaked individual of *S. rostratus*.

Delphinus bredanensis Van Breda.

As a result of Van Breda's description of this species before Cuvier's [illegible] that the skulls generally referred to *Steno rostratus* were of [illegible] species. Van Breda perceived that these skulls were [illegible] from that of his specimen, but concluded that the case was one [illegible] two species very different externally were alike as regards [illegible]. Van Breda later gave, however, convincing evidence that [illegible] Cuvier's description of *S. rostratus* as to [illegible] the [illegible] of his *D. bredanensis*.

Steno frontatus Gray.

[illegible]

We [illegible] specimens, and while certain [illegible] *Steno* [illegible] examined Gray makes the following [illegible]

[illegible]

[illegible]

[illegible] *Delphinus* [illegible] Van Beneden [illegible]

In Cuvier's original description (Ann. du Muséum, XIX, 1812, p. 9) no single skull is mentioned, and the species, therefore, has no type. The description, however, and the figure afterwards published in the *Ossements fossiles*, would suffice for the recognition of the species were it not that others were subsequently erected on skulls closely resembling that figured by Cuvier.

The characters which have been insisted upon as separating the different species relate to the width of the beak and the number of teeth. In the first of these characters, as Professor Flower has already intimated, there is a complete gradation. The following table shows the gradation in twenty-six specimens in European museums, including the type of *S. compressus* and probably also of *S. reinwardtii:*

Comparison of the length of the beak in S. compressus, etc., taken at 100 per cent., with its width at the middle.

Collection.	Number.	Identification.	Proportional width of beak at middle.	Length of skull.	Greatest number of teeth—	
					Upper jaw.	Lower jaw.
			Per cent.	*Inches.*		
1. Leiden	24	Reinwardtii (†Type).	11.5	20.47	25	25
2. Liverpool	7, 7, 66, 31		12.0	21.0	24	24
3. Paris	*a* 3047	Rostratus	12.2	19.5	22	22
4. London (B. M.)	346 *b*	Compressus	12.6	20.5	22	24
5. London (B. M.)	346 *a*	Compressus (Type)	12.9	20.125	25	27
6. Liverpool	24, 2, 63		13.2	21.25	25	24
7. Leiden	26	Planiceps	13.3	19.92	24	25
8. Oxford	X^{5} (juv.)	Rostratus	13.5	19.4	23	24
9. Oxford	1668	Rostratus	14.3	20.2	24	25
10. Liverpool	19, 11, 62		14.3	21.4	22	23
11. Liverpool	13, 11, 68, 1		14.5	20.25	23	24
12. Liverpool	*a*		14.7	21.4	23	23
13. London (B. M.)	346 *d*	Compressus	15.5	20.125	22	20
14. Leiden	None (1)	†Planiceps	15.6	19.68	21	23
15. Leiden	None (2)	†Planiceps	15.8	20.79	21	24
16. Oxford	1676	Rostratus	15.8	20.0	22	22
17. Liverpool	23, 1, 64, 2		15.8	20.25	22	21
18. Leiden	27	†Planiceps	16.2	19.2	21	22
19. Liverpool	21, 5, 62, 1		16.4	21.75	20	21
20. London (B. M.)	245 *d*	Frontatus	16.5	20.375	22	22
21. Liverpool	12, 7, 69, 1		16.9	20.6	21	21
22. London (B. M.)	245 *c*	Frontatus	17.4	20.125	23	22
23. Liverpool	24, 3, 59, 2		18.1	20.85	23	23
24. Liverpool	7, 2, 70, 63		18.7	20.0	23	23
25. Leiden	30	Planiceps	18.8	21.06	21	24
26. Norwich		Frontatus	†21.0	19.2		

A gradation so complete as this evidently renders any character drawn from the proportions of the rostrum useless as an index of specific distinctness, and, unless others can be brought forward, the separation of the skulls into different species is, of course, unwarranted.

The slight variation in the number of teeth has no significance, as the table plainly shows. In all species of dolphins, as a general rule, the individuals having the longest rostrums have the greatest number of teeth.

In Cuvier's figure of the skull of *D. rostratus* (*Oss. foss.*, 4th ed., 1836, pl. 222, fig. 7) the breadth of the rostrum at the middle is 19.1 per cent.

of its length, which makes this a very broad-beaked specimen. Measurements from figures, however, are not always to be relied upon. In the description Cuvier gives the number of teeth as $\frac{26-26}{26-26}$, while the figure shows 21 in the left side of the upper jaw and 24 in the lower jaw. No. *a*3047 in the Paris Museum, labeled *S. rostratus*, and also *bredanensis*, belongs to the opposite end of the series. The breadth of the rostrum at the middle is but 12.2 per cent. of its length. This was probably one of the specimens already in the museum in Cuvier's time.

Steno compressus Gray.

The type of this species, No. 246*a* of the British Museum, is a skull with tolerably narrow rostrum and rather numerous teeth, but apparently without other characters serving to distinguish it from the skulls in the Paris Museum and in other collections. It is improbable, therefore, that it represents a distinct species.

Delphinus reinwardtii Schlegel.

The type of this species is apparently the No. 24 of the Leiden Museum. This is a large skull with a long, narrow rostrum and a rather large number of teeth $\left(\frac{24-25}{25-25}\right)$. It does not differ from the skulls which Gray called *S. compressus*, or, in other words, is a narrow-beaked individual of *S. rostratus*.

Delphinus bredanensis Van Breda.

As already stated Van Breda described this species before Cuvier had discovered that the skins originally accredited to *S. rostratus* were of quite another species. Van Breda perceived that these skins were different from that of his specimen but concluded that the case was one in which two species very different externally were alike as regards cranial characters. Van Breda's figure, however, convinced Cuvier that he was in error, and caused him to accept the same as representing the true external characters of his *D. frontatus* or *rostratus*.

Steno fuscus Gray.

Steno fuscus, Gray, Zool. Erebus & Terror, 1846, p. 44, pl. 26, fig. 1.

What the relationships of this species are, and whether it is a *Steno* at all, must probably always remain in doubt. Gray makes the following statement in regard to it:

Inhab. Cuba, W. S. MacLeay, Esq.

This species is only known by a fœtal specimen in spirit, not in a very good state. Presented to the British Museum by W. S. MacLeay, Esq.

The figure represents an animal resembling *Prodelphinus obscurus*, or indeed not unlike Van Breda's *Steno bredanensis*. The forehead is not separated from the beak by a transverse groove.

I did not see the specimen when in London, and if my memory serves me, was informed that it could not be found. Even if it still exists, however, I think the same ruling should be applied in this case as in that of *Tursiops cymodice*, regarding which Professor Flower says:

> *T. cymodice* may be at once expunged from the list. It is founded upon a single skull of a very young animal; the basilar suture is not closed, and all its distinguishing characters are those of immaturity. It is impossible to say even of which variety it is the young. (*Characters and Divisions*, p. 480.)

Such, too, is the case with this *Steno fuscus*, and it should be dropped forever from the catalogue of species.

Since the foregoing paragraphs were written, Dr. Lütken has published an important account of the genera *Steno*, *Delphinus* and *Prodelphinus*, based on the material in the Copenhagen Museum.*

He gives in plate 1 a colored figure of *S. rostratus*, constructed from data furnished by Captain Andréa. This figure does not agree closely with those of Cuvier, Van Breda or Peters, but is unquestionably much more accurate than those of the first two authors mentioned. That it represents the species called *Delphinus rostratus* by Cuvier and Desmarest is highly probable, and I have, therefore, substituted it for Cuvier's figure as an illustration in the Synopsis.

There are no grounds for considering Peters' figure of *S. perspicillatus* less accurate than the newly-published figure of *S. rostratus*. There is, however, a decided want of agreement between the two figures and the descriptions in regard to the coloration of the species. Until, therefore, it can be proven that *S. perspicillatus* is the young of *S. rostratus*, or that the coloration of the latter is exceedingly variable, it seems to me that the Peters' species must be considered distinct. The two species are quite similar in osteological characters. Their vertebral formulæ are as follows:

S. rostratus, C. 7; D. 13; L. 15; Ca. 30 = 65.

S. perspicillatus, C. 7; D. 12; L. 15; Ca. 32 = 66.

The specimen of *S. rostratus* captured by Captain Andréa and described by Dr. Lütken, was taken in 1° 14′ S. lat., 17° 20′ W. long., or about midway between Ascension Island and the coast of Africa.

The following measurements of the exterior were taken:

	Centimeters.
Total length	257.4
Height immediately in front of the dorsal fin	67.6
From the snout to the dorsal fin	111.8
From the snout to the eye	41.6
From the same to the blow-hole	36.4
From the same to the pectoral fin	65.0

The skeleton was about 240^{cm} long; the head alone 53^{cm}. The first two cervical vertebræ were anchylosed together, but the neural arch

* Chr. Fr. Lütken, K. Danske Vidensk. Selsk. Skr., 6te Raekke, naturviden. og math. Afd., V, 1889, pt. 1, pp. 1–61, 1 pl. and 2 charts.

and rudimentary transverse process of the axis were visible behind those of the atlas. The third cervical had on each side a perpendicular flat triangular process, pierced by a large foramen. In the following three vertebræ the bony ring surrounding the foramen was incomplete. In the seventh cervical there was a tolerably long diapophysis, but no parapopysis. Thirteen pairs of ribs were present, the first of which was much the largest. The first six were attached to the vertebræ by both neck and head.

The first neural spine of the dorsal region was on the second dorsal vertebra, and, with the next following, was directed much backward. The last ten caudal vertebræ, which were located in the flukes, were without neural arches. Twenty-three chevron bones were present, the three posterior ones being rudimentary.

The longest transverse process was on the second lumbar vertebra. The last trace of a transverse process was found on the fourteenth caudal vertebra. The first perforations of the transverse processes for the passage of the caudal artery were in the sixth and seventh caudal vertebræ

Five metacarpal bones were present. The formula of the phalanges was as follows: I, 4; II, 8; III, 6; IV, 3; V, 3.

Dr. Lütken gives, in addition, the following measurements of eight skulls in the Copenhagen Museum. Two of these, Nos. 2 and 5, he regards as possibly belonging to a separate but closely allied species.

Measurements of eight skulls of Steno rostratus. (From Lütken.)

Number.	Length of skull.	Length of brain-case.	Breadth of brain-case.	Length of symphysis of mandible.
	Cm.	*Cm.*	*Cm.*	*Cm.*
2	54.0	21.3	21.3	15.5
6	53.5	22.4	22.5	15.8
1	53.0	22.0	22.6	15.0
10	53.0	21.7	23.1	15.3
9	52.0	20.9	21.0	16.3
5	51.2	19.8	19.8	16.0
3	51.0	21.8	21.8	14.5
4	50.5	21.7	22.1	13.5

One of the two skulls (Nos. 2 and 5) regarded as belonging to a separate species is from the Pacific Ocean. It was obtained by Professor Reinhardt at Honolulu, while on the *Galathea* expedition.

Measurements of twenty-five skulls of Steno rostratus and the type-skull of S. perspicillatus.

	Catalogue number.	Collection.	Type of—	Locality.	Sex and age.	Total length.	Length of beak.	Breadth of beak—	
								At base of maxillary notches.	At its middle.
						Cm.	*Cm.*	*Cm.*	*Cm.*
a	346*a*	Brit. Mus	*S. compressus*			51.1	32.5	9.3	4.2
b	346*b*	do	do			52.1	31.8	9.9	4.1
c	345*c*	do	*S. frontatus*	India		51.1	30.0	10.7	5.2
d	345*d*	do				51.8	30.7	10.5	5.1
e	24, 2, 63	Liverpool Pub. Mus.				54.0	33.6	9.8	4.5
f	12, 7, 60, 1	do				52.3	31.1	10.5	5.2
g	23, 1, 64, 2	do				51.5	30.5	9.7	4.8
h	*a*	do				54.4	32.0	10.2	4.8
i	19, 11, 62	do				54.4	31.9	10.2	4.8
j	7, 7, 66, 31	do				53.4	31.7	9.5	3.8
k	21, 5, 62, 1	do				55.3	33.2	10.8	5.5
l	70, 2, 70, 63	do				50.8	29.2	10.2	5.5
m	24, 3, 59, 2	do				53.0	30.1	9.8	5.5
n	13, 11, 68, 1	do		Indian Ocean(?)		51.5	30.7	10.2	4.4
o		Norwich Mus			Ad.	48.7	29.0	10.8	6.1
p	1676	Oxford Mus			Ad.	50.8	30.5	10.4	4.8
q	*x*5	do			Jr.	49.3	30.2	9.2	4.1
r	1668	do			Ad.	51.3	32.0	9.8	4.6
s	24	Mus. Pays-Bas	*D. reinwardtii*	Java		52.0	34.0	9.0	3.9
t	25	do			Jr.	49.8	31.2	8.7	
u	26	do		Indian Ocean		50.6	32.4	9.5	4.3
v	30	do		(?) Java		53.5	32.0	(?)11.0	6.0
w		do		Atlantic Ocean		50.0	30.2	9.5	4.7
x		do		Indian Ocean		52.8	31.8	10.4	5.0
y	27	do				48.8	29.0	10.5	4.7
	5097	Berlin Univ. Zool. Museum.	*S. perspicillatus.*	South Atlantic	♀ Ad.	49.9	29.3	11.1	5.8

Measurements of twenty-five skulls of Steno rostratus and the type-skull of S. perspicillatus.

	Breadth of intermaxillæ at middle of beak.	Greatest breadth between outer margin of intermaxillæ proximally.	Length of tooth-line.	Last tooth to base of maxillary notch.	Extremity of beak to—		Breadth between—		Temporal fossæ.		Length of mandible.	Length of symphysis of mandible.	Length of tooth-row of mandible.	Depth between angle and coronoid process.	Number of teeth.
					Anterior margin of superior nares.	End of crest of pterygoid.	Orbits.	Hinder margins of temporal fossæ.	Length.	Depth.					
	Cm.	Cm.	Cm.	Cm.	Cm.	Cm.	Cm.	Cm.	Cm.	Cm.	Cm.	Cm.	Cm.	Cm.	
a	2.9	8.0	26.0	6.6	35.5	38.1	16.4	14.5	8.6	8.0	43.2	10.8	27.4	7.4	25—24 / 27—25
b	2.8	.....	.....	.....	.....	.....	.....	15.5	.....	.....	43.8	15.6	.....	.....	22—22 / 24—24
c	3.6	8.0	24.2	6.3	34.3	36.5	19.3	15.0	10.7	9.1	43.2	14.2	25.4	8.6	22—23 / 22—22
d	3.3	.....	.....	.....	.....	.....	.....	.....	.....	.....	43.8	15.6	.....	.....	21—22 / 22—22
e	3.2	.....	27.5	.....	37.6	.....	18.8	15.3	10.2	8.3	46.1	15 3	.....	.....	25 / 24
f	3.8	.....	26.4	.....	36.2	.....	20.3	16.0	11.2	9.5	43.8	13.3	.....	.....	21 / 21
g	3.2	.....	25.4	.....	34.5	.....	18.2	15.3	10.8	8.9	42.5	14.0	.....	.....	22 / 21
h	3.7	.....	.....	.....	.....	.....	20.0	.....	.....	.....	.....	.....	.....	.....	23—22 / 23—22
i	3.2	.....	.....	.....	.....	.....	19.7	.....	.....	.....	.....	.....	.....	.....	23 / 22
j	2.9	.....	.....	.....	.....	.....	17.8	.....	.....	.....	.....	.....	.....	.....	24 / 24
k	3.8	.....	.....	.....	.....	.....	19.7	.....	.....	.....	.....	.....	.....	.....	20 / 21
l	4.0	.....	.....	.....	.....	.....	19.7	.....	.....	.....	.....	.....	.....	.....	23 / 23
m	3.8	.....	.....	.....	.....	.....	20.0	.....	.....	.....	.....	.....	.....	.....	23 / 23
n	2.9	.....	.....	.....	.....	.....	18.8	.....	.....	.....	.....	.....	.....	.....	23 / 24
o	.....	.....	.....	.....	.....	.....	17.5	16.9	.....	.....	41.0	14.0	.....	.....	21—21 / 22—20
p	3.3	.....	.....	.....	.....	.....	18.8	15.0	10.3	8.9	.....	13.4	.....	.....	22—21 / 22—22
q	3.2	.....	.....	.....	.....	.....	16.5	13.2	9.5	8.5	.....	13.2	.....	.....	23—23 / 24—24
r	3.6	.....	.....	.....	.....	.....	17.8	14.6	9.5	8.8	.....	(†)14.0	.....	.....	23—24 / 25—25
s	.....	.....	.....	.....	.....	.....	18.2	13.5	.....	.....	.....	.....	.....	.....	24—25 / 25—25
t	.....	.....	.....	.....	.....	.....	16.5	15.0	.....	.....	.....	.....	.....	.....	24—25 / 25—25
u	.....	.....	.....	.....	.....	.....	17.5	14.2	.....	.....	.....	.....	.....	.....	23—24 / 25—24
v	3.8	.....	27.0	.....	.....	.....	20.0	16.0	.....	15.0	.....	.....	.....	.....	20—21 / 22—24
w	.....	.....	.....	.....	.....	.....	18.0	15.5	.....	.....	.....	.....	.....	.....	21—20 / 23—23
x	.....	.....	.....	.....	.....	.....	19.0	15.7	.....	.....	.....	.....	.....	.....	21—21 / 24—24
y	.....	.....	.....	.....	.....	.....	19.6	15.5	.....	.....	.....	.....	.....	.....	20—21 / 22—20
z	3.7	8.7	24.7	5.6	33.3	35.5	20.4	13.6	11.0	9.3	.....	.....	.....	.....	24—23 / 22—21

STENO PERSPICILLATUS Peters.

Delphinus (*Steno*) *perspicillatus*, Peters, Monatsber. der K. Akad. Berlin, 1876, pp. 360–366, pls. 2, 3.

The reasons for regarding this species as distinct from *S. rostratus* have been given on p. 25. It differs apparently only in external characters. Peters' specimen was a female, and was taken in the Atlantic Ocean, in 32° 29′ 7″ S. lat, 2° 1′ W. long. The measurements of the skull of this individual are, for purposes of comparison, included in the foregoing table of measurements of *S. rostratus* (p. 30).

3. TURSIOPS Gervais.

Tursiops, Gervais, Hist. nat. des Mamm., II, 1855, p. 323. (*Fide* Flower.)

This genus is distinguishable from *Prodelphinus* principally by its less numerous and larger teeth. From *Steno* it differs by reason of its short mandibular symphysis and more numerous vertebræ.

The numerous species described by Gray were founded chiefly upon single skulls, and their true relationships are, therefore, not readily to be made out. From such evidence as we possess, however, there appear to be four species, as follows: *Tursiops tursio* (Fabricius); *Tursiops catalania* (Gray); *Tursiops abusalam* (Rüppell); *Tursiops gillii* Dall.

Tursiops aduncus, Hemp. and Ehrenberg, may or may not prove to be distinct, but as we have not had access to the original description of that species, we venture no opinion regarding it.

TURSIOPS TURSIO (Fabricius).

Delphinus tursio, Fabricius, Fauna Groenland., 1780, p. 49.
Delphinus tursio, Bonnaterre, Cétologie, 1789, p. 21.
Delphinus truncatus, Montagu, Mem. Wern. Soc., III, 1821, p. 75.
Tursiops tursio, Gervais, Comp. Rend., 1864, p. 876.
Delphinus metis, Gray, Zool. Erebus and Terror, 1846, p. 38, pl. 18.
Delphinus cymodice, Gray, Zool. Erebus and Terror, 1846, p. 38, pl. 19.
Delphinus eurynome, Gray, Zool. Erebus and Terror, 1846, p. 38, pl. 17.
Phocæna compressicauda, Lesson, Cétologie, p. 199.

At the beginning of my cetological studies, and before I had examined any European specimens, I was inclined to regard the "Porpoise" of the Atlantic coast of America as specifically distinct from the "Bottlenose" of European waters. I have since come to regard them as identical. I have examined side by side the skeletons of two old individuals of almost exactly equal size, one from off Hatteras, North Carolina (22304 ♀), and the other from the coast of England (21,151), and find only such differences as appear to me to be due to individual variation.

Before considering the types of the different species which have been thus far described, I shall discuss the series of skulls in the national

collection. This series comprises about forty-five specimens, of which ten are fragmentary, and three fœtal or very young. Of four only is the sex known.

The greater part of these skulls were collected by Dr. H. C. Yarrow at Fort Macon, North Carolina; others are from the fishing grounds at Hatteras, North Carolina; and the remainder are from different points on the Atlantic coast between New Jersey and Florida. The species is perfectly well known to our fishermen. Large numbers have been taken for many years at Hatteras, where I have myself witnessed the capture of between eighty and ninety in a single day. These individuals were about equally divided between the two sexes, and were of all ages.

From the skulls above mentioned I have selected twenty-one perfect specimens of nearly equal size for comparison. Their sex is unknown, but from the fact that they were picked up at random on the beach, and that males and females frequent this coast in about equal numbers, it is highly improbable that all are males or all females. If there are differences between the sexes as regards the proportions of the length and width of the beak they should appear on comparison of the measurements.

In his valuable paper on the cetaceans of Southwestern France, Dr. Fischer calls attention to sexual differences in the skulls of *Tursiops tursio*. His words (translated) are as follows:*

Upon examining together the heads of males and females, one perceives that they present characteristic differences. The beak is longer and relatively narrow in the males. * * * The heads of the females are remarkable on account of the breadth of the beak at its base and at the middle; the beak has consequently a more triangular form.

The measurements given by Dr. Fischer do not entirely bear out these statements. From these the following results are obtained:

Comparison.	♂ 1 compared with ♀ 6 (adulte).	♂ 3 compared with ♀ 4 (épiphysée).	♂ 3 compared with ♀ 11 (épiphysée).	♂ 7 compared with ♀ 5 (jeune).
Relative length of beak of male compared with that of female	Longer.	Shorter.	Shorter.	Longer.
Width of beak at base in male compared with ditto in female	Narrower.	Narrower.	Narrower.	Wider.
Width of beak at middle in male compared with ditto in female	Narrower.	Narrower.	Narrower.	Wider.

It appears from these comparisons that ♂ 1 has a longer and narrower beak than ♀ 6; ♂ 3 has a *shorter* and narrower beak than ♀ 4 ♀ 11; and ♂ 7 has a longer and *wider* beak than ♀ 5. Thus we have three of the four possible combinations—long and narrow, long and wide, short and narrow—in the same sex.

*Actes de la Soc. Linn. de Bordeaux, 4me sér., v, 1881, p. 159.

The four skulls of known sex in the national collection have the following absolute proportions:

Measurements of four skulls of T. tursio.

Measurements.	20901 (Fire Island, N.Y.).	16504 (Cherrystone Point, Va.).	20962 (Turkey Gut, N. Y.).	22304 (off Hatteras, N.C.).
Total length	43.3	43.9	44.0	52.9
Length of beak	22.4	24.1	24.4	28.9
Breadth of beak at notches	11.2	10.1	10.3	12.6
Breadth of beak at middle	7.0	6.9	6.4	8.0
Breadth of intermaxillæ at middle	3.7	3.2	3.3	4.4
Depth of beak at middle	.....	2.7	.....	2.8
Length of tooth-line	19.4	20.4	21.1	24.8
Breadth across orbital processes of frontal	20.0	20.4	19.3	24.7
Length of mandible	36.2	37.5	37.6	45.0
Depth at coronoid	8.1	8.4	7.9	9.4
Teeth	24-25 / 24-24	24-24 / 23-23	23-23 / 23-25	26-25 / 24-24
Age	Young.	Young.	Young.	Old.
Sex	♂	♂	♀	♀
Condition	Fresh.	Fresh.	Fresh.	Fresh.

From these measurements we select the following for comparison:

Measurements.	20901, ♂ *a*, Fire Island, N.Y. (young).	16504, ♂ *b*, Cherrystone Point, Va. (young).	20962, ♀ *c*, Turkey Gut, N. Y. (young).	22304, ♀ *d*, Hatteras, N. C. (old).
	Cm.	*Cm.*	*Cm.*	*Cm.*
Total length	43.3	43.9	44.0	52.9
Length of beak	22.4	24.1	24.4	28.9
Breadth of beak at maxillary notches	11.2	10.1	10.3	12.6
Breadth of beak at middle	7.0	6.9	6.4	8.0

A comparison of the length of the beak, relative to the total length, and of the width of the beak at its base and at its middle relative to its total length, gives the following results:

Comparison.	♂ *a* compared with ♀ *c*.	♂ *b* compared with ♀ *c*.	♂ *a* compared with ♀ *d*.	♂ *b* compared with ♀ *d*.
Relative length of beak in male compared with ditto in female	Longer.	Shorter.	Shorter.	Longer.
Relative width of beak at base in male compared with ditto in female	Wider.	Narrower.	Wider.	Narrower.
Relative width of beak at middle in male compared with ditto in female	Wider.	Wider.	Wider.	Wider.

The same diversity appears here as in the previous case. The old female, which would be supposed to have the sexual characters strongly marked, has a relatively shorter and wider beak at the base than one of the young males, but a longer and narrower beak than the other.

Coming now to the series of twenty-one skulls, before mentioned, we find the same variation. In some the beak is long and narrow, and *vice*

versa; in others short and narrow, and the opposite. The table of measurements is as follows, the skulls being arranged in order of their absolute length:

Measurements of twenty-one skulls of Tursiops tursio.

[Measurements in centimeters.]

Number.	Total length.	Length of beak.	Breadth of beak at notches.	Breadth of beak at middle.	Breadth of intermaxillæ at same point.	Depth of beak at middle (including intermaxillæ).	Length of tooth-line.	Breadth between orbital processes of frontal.	Total length of mandible.	Depth between angle and coronoid process.	Teeth.	Remarks.
12277 (N. C.)	43.2	23.2	10.8	7.0	3.8	2.7	19.5	19.1	36.5	8.2	23—23 / 24—23	Sutures distinct; teeth sharp; fresh.
11997 (N. C.)	43.3	22.9	10.8	6.8	3.4	2.6	19.5	20.3	.....	.....	.....	Sutures open; beach-worn.
12005 (N. C.)	44.2	23.6	12.0	7.9	4.7	3.2	20.0	21.8	.....	.....	23?—23	Sutures distinct; beach-worn.
12007 (N. C.)	44.3	24.1	10.8	6.4	3.6	.....	20.5	.....	.....	.....	.....	Young; beach-worn.
12275 (N. C.)	44.8	24.6	10.3	6.3	3.4	2.6	20.9	20.9	38.0	8.2	24—24 / 23—24	Sutures distinct; teeth sharp; fresh.
20767 (Point Lookout, Md.)	45.2	24.8	11.4	6.9	3.8	.....	21.3	20.9	38.4	8.5	24—23 / 24—24	Sutures distinct; teeth sharp; fresh.
11998 (N. C.)	45.6	24.2	12.4	7.9	4.2	3.1	20.8	22.6	.....	.....	22—23	Sutures open; beach-worn.
12011 (N. C.)	45.6	24.7	11.4	7.4	4.7	2.9	20.7	20.6	.....	.....	23—22	Sutures distinct; unknown; beach-worn.
12009 (N. C.)	45.6	24.6	12.1	7.9	4.0	2.9	21.5	21.9	...	.....	26—25	Do.
12013 (N. C.)	46.2	25.1	11.2	7.6	3.9	3.0	21.6	20.3	.....	.....	24—24	Sutures open; beach-worn.
12006 (N. C.)	46.3	24.7	11.8	7.6	4.1	3.1	21.2	22.1	.....	.....	25—24	Do.
11994 (N. C.)	46.3	24.7	12.1	7.5	4.2	3.0	21.2	21.9	.....	.....	.....	Do.
12002 (N. C.)	46.4	24.7	11.7	8.0	4.2	2.9	20.3	21.8	.....	.....	22—22	Do.
11995 (N. C.)	46.4	24.7	11.5	7.2	4.2	3.0	21.2	22.8	...	.....	24—24	Do.
12004 (N. C.)	46.6	25.4	11.8	7.5	4.0	2.9	21.4	21.3	.....	.....	24—23	Do.
11993 (N. C.)	46.7	25.7	11.1	7.1	3.8	2.8	21.9	20.4	.....	.....	22—24	Do.
12001 (N. C.)	46.8	24.8	12.2	7.5	4.1	3.1	21.7	22.1	.....	.....	23—23	Do.
12274 (N. C.)	47.0	25.5	11.6	7.3	4.2	2.9	21.2	22.3	39.7	8.6	24—24 / 24—24	Sutures distinct; teeth sharp; fresh.
12276 (N. C.)	47.1	25.5	11.1	7.0	3.9	2.7	21.8	20.7	39.0	8.3	25—25 / 24—24	Do.
12014 (N. C.)	47.3	25.8	11.9	7.3	4.2	3.2	21.9	21.5	.....	.....	26—26	Sutures open; beach-worn.
22080 (Hatteras)	47.8	27.0	11.2	6.7	3.5	2.9	23.2	20.9	.....	.....	23—25	Sutures open; fresh.

The skulls, it will be observed, vary but little in length; they rise by gradations of 6^{mm} and less from 43.2 to 47.8^{cm}.

We shall first examine the table for indications of sexual differences in the relative length of the beak as compared with the total length of

the skull. The proportional length of the beak in the different specimens, arranged in an ascending scale, is as follows:

52.9 per cent.	53.4 per cent.	54.4 per cent.
53.0	53.7	54.5
53.1	53.9	54.5
53.2	54.1	54.9
53.2	54.2	55.0
53.4	54.3	55.4
53.4	54.3	56.5

It appears that, excepting in the skull with relatively longest beak, the proportion of the length of the beak rises by gradations of four-tenths of 1 per cent. and less.

The proportion of the width of the beak at its base to its length is as follows:

41.5 per cent.	46.0 per cent.	47.4 per cent.
41.9	46.1	47.8
43.1	46.1	49.0
43.5	46.4	49.2
44.6	46.6	49.2
44.8	46.6	50.9
45.5	47.1	51.2

The gradations here are 1.7 per cent., 1.1 per cent., and less.

The proportions of the width of the beak at its middle compared with its length rise by gradations of 1 per cent. and less, as follows:

24.8 per cent.	28.6 per cent.	30.3 per cent.
25.6	29.1	30.4
26.5	29.5	30.8
27.5	29.7	32.1
27.6	30.0	32.4
27.8	30.2	32.6
28.3	30.2	33.5

In all three cases the greatest variation is at the extremes of the series.

What do these proportions show? Apparently that the relative length and width of the beak give no indication of the sex. Unless these twenty-one specimens are all of the same sex, which is very improbable, for the reasons stated, the gradation of proportions is such that it would be impossible to divide the females from the males.

The skulls of greatest absolute length have not relatively longest beaks. The beaks which are relatively longest, as compared with the absolute total length of the skull, are, generally speaking, narrowest at the base and middle in proportion to their absolute length.

The length of the mandible as compared with the length of the skull, minus the beak, is greater in all of Dr. Fischer's males than in his females. In both of my young males (20901 and 16504), on the contrary, it is shorter than in the young female, 20962; and in one of the former (20901) it is shorter than in the old female, 22304.

Dr. Fischer's Nos. 8 and 9, of unknown sex, but which from a consideration of the proportions he believes to be females, should, I think, be regarded as males if the length of the mandible alone is considered, but, on the contrary, as females if the breadth of the beak is considered.

From the facts presented, and numerous others, I am inclined to regard the variation in cranial proportions as of little value in determining the sex. From Dr. Fischer's material and that to which I have had access, however, we are able to get some idea of the limits of variation in cranial proportions. The greatest and least proportions, as regards the length of the beak in thirty-five specimens, are as follows:

Proportion of length of beak to total length of skull:
Greatest.....58.2 per cent. (Dr. Fischer, No. 1, ♂ très adulte).
Least .....52.9 per cent. (11997, Fort Macon, young).
[Note .....48.7 per cent. in fœtus, 24300, Hatteras.]
Proportion of width of beak at base to its length:
Greatest.....51.9 per cent. (Dr. Fischer, No. 4, ♀, 6piph.).
Least .....41.5 per cent. (22080, Hatteras, not old).
[Note .....48.7 per cent. in fœtus, 24300, Hatteras.]
Proportion of width of beak at middle to its length:
Greatest.....36.7 per cent. (Dr. Fischer, No. 11, ♀, 6piph.).
Least .....24.8 per cent. (22080, Hatteras).
[Note .....31.6 per cent. in fœtus, 24300, Hatteras.]

The skull absolutely longest of this series is Dr. Fischer's No. 1, a male "très adulte," 55^{cm}; my largest specimen is No. 22304, old female, 52.9^{cm}.

Tursio eurynome Gray.

I pass now to the consideration of the species identical with or allied to *T. tursio*. The first of these is *T. eurynome*, Gray, founded on a single skull, No. 356*a*, in the British Museum. The chief characters which Gray gives are cranial proportions. Regarding its relationships he says:

The skull of this species is most like *D. tursio;* but the nose is one-fourth longer than the length of the head, slenderer and more rounded, and the teeth smaller.*

In the diagnosis of *D. tursio*, however, he has: "Skull-nose five-ninths the entire length." On comparing his measurements of *T. eurynome*, it appears that this proportion exists here also. In relative breadth the beak exceeds several of the North Carolina skulls, notably No. 22304, ♀, from Hatteras, which is only 3^{mm} larger. It agrees very closely in absolute size of parts with Dr. Fischer's ♂ No. 1. In none of its relative proportions does it fall outside the limits of variation of the series discussed on page 35. Speaking of this skull and others in the series, Gray himself says: "These are all very much alike."† Professor Flower includes it in his "section" *T. tursio*, with others, saying that

*Cat. Seals and Whales, p. 261
†Suppl. Cat. Seals and Whales, p. 75.

some of them "may be specifically distinct."* With this skull, the type of *T. metis*, and the skulls called *T. truncatus* in the British Museum before me, I wrote in my note-book, "It is doubtful if any distinction is to be made between these."

For my own part I have no hesitancy in making *T. eurynome* a synonym of *T. tursio*. The species is founded on a single skull, and its characters are drawn from proportions. It has been shown that neither in absolute size nor in proportions does it lie outside the limits of variation of *T. tursio*. It should be borne in mind that in cases of this kind we can never hope to acquire specimens agreeing *exactly* with the type. Among a thousand skulls of the same species it is doubtful if any two absolutely alike could be found.

Tursio metis Gray.

The second of Gray's species to be considered is his *Tursio metis*. Gray states that the skull "differs from *Delphinus Tursio's* in the nose being much shorter and more conical and acute."† As a matter of fact, the beak is relatively longer than the skull of *T. tursio* from Montagu's collection in the British Museum (353*a*), which Gray includes in the latter species in the Catalogue. That the beak is more acute than in many specimens of *T. tursio* is true; but it is less acute than in No. 22080 of that species from Hatteras, which was picked up on the beach with others by myself. Comparing it with the latter, I find that the beak is a trifle shorter, but somewhat wider both at the base and at the middle, and that the intermaxillæ are also wider. I cannot but regard it as a narrow-beaked specimen of *T. tursio*.

Tursio cymodice Gray.

Tursio cymodice is founded on a youngish skull. It has an almost exact counterpart in No. 20767, from Point Lookout, Maryland.

Measurements.	355*a*. Tursiops cymodice. Type.	20767. Tursiops tursio. Point Lookout, Maryland.
	Cm.	*Cm.*
Total length	45.7	45.2
Length of beak	24.9	24.8
Breadth of beak at maxillary notches	11.6	11.4
Breadth of beak at middle	6.8	6.9

Professor Flower very justly says:

T. cymodice may be at once expunged from the list. It is founded on a single skull of a very young animal.‡

* Flower, P. Z. S., 1883, p. 487.

† Cat. Seals and Whales, p. 257.

‡ Proc. Zool. Soc. London, 1883, p. 480.

It is interesting, however, to know that it is in all probability simply a young specimen of *T. tursio*.

In the following table are brought together measurements of the type skulls of *T. metis*, *eurynome*, and *cymodice*, and of some other skulls in the British Museum, labeled *tursio*, *metis*, etc.:

Table of measurements.

TURSIOPS TURSIO.

Catalogue number.	Collection.	Type of—	Locality.	Sex and age.	Total length.	Length of beak.	Breadth of beak—		Breadth of intermaxillæ at middle of beak.	Greatest breadth between outer margins of intermaxillæ, proximally.
							At base of maxillary notches.	At its middle.		
					Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*
356*a*	Brit. Mus.	*T. eurynome* ..	North Sea ?.....	....	52.0	30.5	13.5	8.5	4.5	9.9
357	...do	*T. metis*.....	.....	....	52.1	29.3	13.0	7.3	4.3	9.1
355*a*	...do	*T. cymodice*...	....	Jr.	45.7	24.9	11.5	6.7	4.0	9.1
353*a*	...do	.....	.....	....	54.6	30.5	14.5	10.2	5.6	10.9
353*g*	...do	.....	Frith of Forth..	....	57.8	32.0	15.8	9.7	5.7	11.2
353*h*	...do	.....	.....	....	49.3	27.3	13.2	8.7	4.5	9.9
357*b*	...do	.....	Herne Bay.....	....	55.1	31.4	13.7	8.5	4.6	10.2

Catalogue number.	Length of tooth-line.	Last tooth to base of maxillary notch.	Extremity of beak to—		Breadth between—		Temporal fossæ.		Length of mandible.	Length of symphysis of mandible.	Length of tooth-row of mandible.	Depth between angle and coronoid process.	Number of teeth.
			Anterior margin of superior nares.	End of crest of pterygoid.	Orbits.	Hinder margins of temporal fossæ.	Length.	Depth.					
	Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	
356*a*	25.6	5.8	35.6	38.6	23.0	.....	10.6	7.8	45.6	6.2	24.6	9.5	$\frac{25-25}{23-23}$
357	25.4	4.8	35.6	36.0	21.3	16.4	11.7	8.3	44.2	6.7	24.5	9.8	$\frac{23-23}{22-22}$
355*a*	20.8	5.2	28.9	31.1	19.8	16.4	9.0	7.2	38.1	6.2	20.8	8	$\frac{24-23}{21-21}$
353*a*	25.8	5.6	35.7	38.5	25.4	15.0	12.7	9.4	.....	.....	.....	.....	$\frac{21-20}{?-?}$
353*g*	26.7	6.0	39.4	41.7	28.0	16.9	13.2	8.5	50.8	8.0	26.7	10.9	$\frac{21-20}{21-21}$
353*h*	23.4	5.3	31.5	33.7	23.1	17.5	10.9	7.5	41.9	6.1	22.6	9.4	$\frac{21-20}{20-20}$
357*b*	26.2	6.6	37.3	.....	23.9	16.8	11.1	7.9	46.7	6.7	26.2	9.7	$\frac{24-24}{23-24}$

TURSIOPS CATALANIA (Gray).

Delphinus catalania, Gray, Proc. Zool. Soc. London, 1862, p. 143.
Tursio catalania, Gray, Cat. Seals and Whales, 1866, p. 232.

This species is distinguishable from *T. tursio* by its smaller size, relatively longer beak, and style of coloration.

The skull (No. 1391*a*) of the larger of the two specimens reported by Gray, though only 43.4^{cm} long, belonged to an adult animal, as is attested by the fact that from this individual were taken two fœtuses.* The length of the beak in this specimen is 58 per cent. of the entire length of the skull, and in the second type-skull (No. 1391*b*), 57.8 per cent. So long a beak is rarely or never found in *T. tursio*.

The lower surfaces of the body in both of Gray's specimens were covered with spots or blotches of dark color, a style of coloration which, so far as I am aware, has never been observed in *T. tursio*.

There are some peculiarities in the types which merit attention. In No. 1391*a*, the larger of the two skulls, the pterygoids are widely separated (the tips being 5^{cm} apart), while in 1391*b* they are in contact in the median line. The relation of the parts in the former specimen would, according to Professor Flower's arrangement of the genera, throw it into *Sotalia*, to which genus this skull taken alone would probably have been relegated. But there is no other essential difference between this and the second skull, and taking into consideration the data we have regarding the two individuals, there can be little doubt that they belong to one and the same species.

The front mandibular teeth are much worn in 1391*a*, and considerably also in the second specimen. The symphysis in both is moderately keeled. The intermaxillæ are very convex and high and somewhat "humped" near the middle of the beak. They are apart anteriorly. The triangular prenarial area extends 8.2^{cm} from the nares and is concave.

Professor Flower has already assigned to this species No. 3012 in the Museum of the Royal College of Surgeons, and No. *a*3070 in the Paris Museum from "China Seas." To these should probably be added No. *a*3059 in the Paris Museum, whose label bears the words "? Mers d'Inde." Measurements of these three specimens and of the types are appended.

* Gray, l. c.

Table of measurements.

TURSIOPS CATALANIA.

Catalogue number.	Collection.	Type of—	Locality.	Sex and age.	Total length.	Length of beak.	Breadth of beak— At base of maxillary notches.	Breadth of beak— At its middle.	Breadth of intermaxillæ at middle of beak.	Greatest breadth between outer margins of intermaxillæ, proximally.
					Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*
1391*a*	Brit. Mus	*T. catalania.*	Cape Melville, Aust.	♀	43.4	25.2	10.2	6.1	7.3	7.4
1391*b*	....do	....do	C. Flattery, Austr	♀	†41.3	23.8	10.4	6.1	3.3	7.1
3012	R. Col. Surg			...	43.6	25.4	10.4	5.1	3.2	7.0
*a*3070	Mus. d'Hist. nat.*		China Seas	...	43.6	25.4	10.9	5.9	3.3	7.6
*a*3059	....do		Mers d'Inde †	...	46.2	26.0	10.9	5.8	3.0	8.1

Catalogue number.	Length of tooth-line.	Last tooth to base of maxillary notch.	Extremity of beak to— Anterior margin of superior nares.	Extremity of beak to— End of crest of pterygoid.	Breadth between— Orbits.	Breadth between— Hinder margins of temporal fossæ.	Temporal fossæ. Length.	Temporal fossæ. Depth.	Length of mandible.	Length of symphysis mandible.	Length of tooth-row of mandible.	Depth between angle and coronoid process.	Diameter of teeth.	Number of teeth.
	Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	
1391*a*	21.3	4.7	28.7	30.5	18.5	12.8	9	7	37.4	6.6	21.1	7.7	0.76	28–28 25–25
1391*b*	19	5.8	27.7	29.3	19	14.1	9.4	7.5	‡35.6	†6.1	†19.3	7.9	0.6	21+–24 23+ 23
3120	29.9	4.7	30.5	28.2	18.4	12.3	9.5	7.9	37.4	6.7	20.9	7.3	.....	?–24 ?–22
*a*3070	20.8	5.6	28.2	.....	19	12.9	9.7	7.4	37.9	6.6	.....	7.4	.....	23–23 23–23
*a*3059	21.6	5.3	30.5	.....	20.1	14	9.1	6.9	39.2	5.8	.....	7.6	.....	25–25 25–25

* Montigny, 1854.
† About 2^{mm} should be added for breakage of tip of beak.

TURSIOPS ABUSALAM (Rüppell).

Delphinus abusalam, Rüppell, Museum Senckenbergianum, III, 1845, p. 140, pl. xii, figs. 1–6.

This species closely resembles *T. catalania*, and may be identical with it. Rüppell has appended no measurements of the skull to his admirable description, but from his figure it would appear that the beak, though rivaling that of *T. catalania* in length, has the same proportional breadth as in *T. tursio*. The teeth are slightly more numerous than is usual in the latter species, and in this again we are reminded of *T. catalania*.

In color *T. abusalam* agrees with neither of the species with which I have compared it, the upper parts being dark sea-green. *T. tursio*, as

I have observed it, is always clear plumbeous gray above. The color of dead specimens is very dark, but I have never observed a greenish tinge in the coloration. The types of *T. catalania* were lead-colored. We might divide, therefore, the three species by their coloration as follows:

1. Upper parts lead-colored.
   a. Belly spotted ..... *T. catalania.*
   b. Belly unspotted ..... *T. tursio.*
2. Upper parts dark sea green.
   Belly spotted ..... *T. abusalam.*

The proportions of the body are much alike in *T. catalania* and *T. abusalam*, as will be seen from the following comparative table:

Measurements.	T. catalania (from Macgillevray, reduced to meters), ♀.	T. abusalam (from Rüppell, reduced to meters), ♀ adult.
Total length	2.058	1.949
Tip of snout to eye	0.305	0.297
Tip of snout to anterior base of dorsal fin	0.915	0.893
Height of dorsal fin (vertical)	0.203	0.216
Distance between the extremities of the flukes	0.559	0.514

The skeleton of *T. catalania* is unknown; for *T. abusalam* Rüppell gives the following vertebral formula: C., 7; D., 12; L., 16; Ca., 26=61.

In two of the skeletons of *T. tursio* in the national collection, however, but twelve pairs of ribs are present, and in one of these, which appears to be perfect, the total number of vertebræ is but sixty-one. We can, therefore, make no separation on the basis of the total number of vertebræ.

From such indications as we possess, this species appears to be intermediate between *T. tursio* and *T. catalania*, but most closely allied with the latter. It would not be a matter of surprise if it should prove to be identical with *T. catalania.*

Since the foregoing remarks were written Dr. W. Kobelt, director of the Senckenberg Museum, has very obligingly sent me some measurements of the type-skull in the collections of that institution. From these it appears that the beak is longer than in *T. tursio*, as already stated, and is much narrower at the base than in either *T. tursio* or *T. catalania.* Its breadth at the middle is about as in the latter species. The breadth at the orbits, however, is less than in either of the others. I subjoin the measurements:

Measurements of the type skull of Tursiops abusalam, ♀.

	Centimeters.
Total length	46.0
Length of beak	27.0
Breadth of beak before the notches	9.2
Breadth of beak at its middle	6.8
Breadth of intermaxillæ at same point	3.4
Breadth between centers of orbits	18.7

TURSIOPS PARVIMANUS Lütken.

Tursiops parvimanus Lütken, K. Danske Vidensk. Selsk Skr., 6th Raekke, IV, 1887, p. 354.

Dr. Lütken has described under this name a small form, which is closely allied to *T. tursio*.

It differs chiefly in having the *third digit longer than the second, with more numerous phalanges*. The formula of the phalanges is 2, 6, 8, 3, 1. The vertebral formula is as follows: C., 7; D., 13; L., 15; Ca., 27=62. In color the species is blackish on the back and fins, and grayish-white on the belly.

The species is founded on a single young individual from the Adriatic. A diagnosis is given in the second part of this work.

TURSIOPS GILLII Dall.

Tursiops gillii, Dall, Proc. Cal. Acad. Sci., V, 1873, p. 13; Scammon, Marine Mammalia, 1874, p. 288.

This species was founded by Mr. Dall upon a single mandible, No. 13022, from Monterey, Cal.,* collected by Capt. C. M. Scammon. It belonged apparently to an adolescent individual. Although the mandible, as a rule, possesses no characters which will serve for the distinction of closely allied species, there is one in this case which seems of value, namely, the comparative size of the condyles. In this mandible the greatest diameter of the condyle is contained twice only in the greatest depth of the ramus. In all the mandibles of *T. tursio*, on the contrary, the greatest diameter of the condyle is contained two and a half times in the greatest depth of the ramus. The comparatively large condyles of *T. gillii* are found again in a skull of *Tursiops*, 54^{cm} long, from Lower California, No. 12054, collected by Captain Scammon. This skull belonged to an aged individual; the sutures are largely obliterated and the teeth are much worn.

From its proportions alone this skull could scarcely be distinguished from one of *T. tursio*, but the relations of the bones on the under surfaces are decidedly different. In *T. tursio* the optic canal rises gradually to the level of the antero-internal border of the frontal, and the whole inferior surface of the frontal is nearly plane. In *T. gillii* the optic canal ends abruptly without reaching the level of the prominent rounded antero-internal border of the frontal, which latter bone is deeply concave.

In the wall of the temporal fossa of *T. gillii* the lower part of the parietal appears as a narrow band between the anterior margin of the

* Although this specimen is not marked "type" there can be no doubt but that it is the one from which the species was described. Mr. Dall, who kindly examined the mandible at my request, could not decide whether it was his type or not, fourteen years having passed since he last saw it. It corresponds, however, absolutely to his measurements, and is furthermore, the only separate mandible of a *Tursiops* from California in the collection.

squamosal and the posterior margin of a backward extension of the frontal, while in *T. tursio* the frontal has no backward extension and the parietal is broad inferiorly. Numerous other differences are present, which, with those mentioned, I have not found in any of the variations of *T. tursio*.

Of the external appearance of this dolphin we know but little. Scammon, from two "momentary observations," describes it "as black all over, lightened a little below." His outline resembles that of a *T. tursio*, except that the dorsal fin is narrower than is common in that species.

Table of measurements.

TURSIOPS GILLII.

Catalogue number.	Collection.	Type of—	Locality.	Sex and age.	Total length.	Length of beak.	Breadth of beak—		Breadth of intermaxillæ at middle of beak.	Greatest breadth between outer margins of intermaxillæ proximally.
							At base of maxillary notches.	At its middle.		
					Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*
13022	U. S. Nat. Mus...	*T. gillii* .	Monterey, Cal.....	....	.....	.....	.....	.....	.....	.....
12054	...do	.....	Lower California..	Ad.	54.0	29.8	14.1	8.8	4.6	10.0
a3060	Mus. d'Hist. Nat .	.....	Monterey, Cal.....	....	50.8	27.7	13.7	7.9	4.3	9.2

Catalogue number.	Length of tooth-line.	Last tooth to base of maxillary notch.	Extremity of beak to—		Breadth between—		Temporal fossæ.		Length of mandible.	Length of symphysis of mandible.	Length of tooth-row of mandible.	Depth between angle and coronoid process.	Transverse diameter of largest tooth.	Number of teeth.
			Anterior margin of superior nares.	End of crest of pterygoid.	Orbits.	Hinder margins of temporal fossæ.	Length.	Depth.						
	Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	
13022	.....	.....	.....	.....	.....	.....	.....	.....	42.7	5.6	23.4	10.7	0.9	1–1 21–22 23–23
12054	25.4	5.6	35.5	36.6	24.5	15.4	13.5	8.5	46.1	6.3	25.5	9.7	0.9	22–22
a3060	24.2	6.4	33.8	34.8	22.9	.....	11.7	7.4	43.2	6.6	.....	9.4	.....	21–19 19–19

4. DELPHINUS Linné.

Delphinus, Linné, Systema Naturæ, 10th ed., 1758, p. 77.

The most salient character by which this genus, in its present restricted limits, is distinguished is the presence of two broad and deep lateral grooves in the palate. This is, indeed, the only character by which

in the present state of our knowledge it is distinguishable from *Prodelphinus*, its nearest ally, and it would even appear that *D. roseiventris*, Wagner, in some degree annuls the value of this distinction, since the grooves of its palate are shallow, though the pterygoids are very narrow, as in *D. delphis*.

DELPHINUS DELPHIS Linné.

Delphinus delphis, Linné, Syst. Nat., 10th ed., 1758, p. 77.
Delphinus major, Gray, Cat. Seals and Whales, 1866, p. 396.
Delphinus fulvofasciatus, Wagner, Schreber's Säugeth., pl. 361, fig. 1; Hombron and Jacquinot, Zool. Voyage de l'Astrolabe et Zélée, III, 1853, p. 37, Atlas, pl. 21, fig. 1, pl. 23, figs. 1, 2.
D. Forsteri, Gray, Cat. Seals and Whales, 1866, p. 248; Synopsis, 1868, p. 8.
Delphinus janira, Gray, Zool. Erebus and Terror, 1846, p. 41, pl. 23; Catalogue, 1st ed., 1850, p. 123; 2d ed., 1866, pp. 245, 398; Supplement, 1868, p. 68.
Delphinus pomeegra, Owen, Trans. Zool. Soc. London, VI, 1869, p. 23.
Delphinus Bairdii, Dall, Proc. California Acad. Sci., V, 1873, p. 12; Scammon's Mar. Mamm., 1874, p. 283.
Delphinus Moorei, Gray, Catalogue, 1866, p. 396; Supplement, p. 68.
Delphinus Walkeri, Gray, Catalogue, 1866, p. 397; Supplement, p. 68.
Delphinus novæ-zealandiæ, Quoy & Gaimard, Voyage de l'Astrolobe, Mamm., 1830, p. 149.
Delphinus albimanus, Peale, U. S. Explor. Exped., 1st ed., VIII, 1848, Mamm. and Ornith., 1848, p. 33; Cassin, ditto, 2d ed., 1858, p. 29, pl. 6, fig. 1.
Delphinus marginatus, Lafont, Actes d. l. Soc. Linn. de Bordeaux, 3d ser., VI, p. 518.
D. fusus, souverbianus, variegatus, balteatus, moschatus, Lafont, Fischer, Actes d. l. Soc. Linn. de Bordeaux, 4th ser., V, 1881, p. 127.

The elaborate discussion of this species by Fischer (op. cit.) leaves little to be said until great accumulations of new material have been made. I shall confine myself, therefore, to the consideration of his conclusions in the light of such material as I have at command. From the examination of fresh specimens and skulls, I am convinced that the common *Delphinus* of the Atlantic coast of North America is, as it has generally been considered to be, identical with Linné's *Delphinus delphis*. I have little hesitancy, therefore, in testing the conclusions based upon European specimens by specimens from American waters.

As regards the color of this species, I am convinced of the wisdom of Professor Fischer's remarks: "On ne saurait établir des espèces d'après des caratères aussi instables." There are in my charge drawings of four specimens taken at different times on our Atlantic coast, and a photograph of a fifth. No two of these agree *exactly* with one another nor with any of Lafont's species.

Drawing No. 1 represents an individual similar to that represented by Professor Fischer (Pl. IV, Fig. 1), under the name of *D. delphis*, var. *fusus*. It differs, however, in having no white area on the side below the dorsal fin. An area over the anus is yellowish, like the anterior portion of the side. The long narrow streaks of color on the sides are gray rather than greenish or black. The sex of this specimen and the next is unfortunately unrecorded.

Drawing No. 2 is similar to the last, but the yellow color of the anterior portion of the side is dull and grayish. The light area back of the dorsal fin is white, as in Professor Fischer's figure of *fusus*. A black band starts from the lower side of the tail, as in Professor Fischer's figure of *souverbianus*, but reaches the line of the anterior base of the dorsal fin. The lateral lines are light gray.

Drawings Nos. 3 and 4 represent, respectively, a female and male taken at the same time.

The female resembles Fischer's figure of *moschatus* (Pl. v, Fig. 1), but the lower jaw is dark-greenish gray, which color extends to and includes the pectoral. The pinkish white of the belly does not extend back of the anus nor above the level of the pectoral fin. All the upper portion of the side is of a nearly uniform dark gray traversed by a narrow band of lighter gray.

The male is like the female, except that the lower half of the body, from about the base of the pectoral fin to and beyond the anus, is of a uniform light gray.

The photograph represents one female like *fusus*, but with a light band at the base of the beak like that in *variegatus*.

Another specimen which I examined had a large area in the center of the dorsal fin nearly pure white.

From these five specimens we would be compelled, following Lafont's opinions, to describe three additional species. Such a course appears to me far from advisable. I am strongly of the opinion that these differences of color are to be looked upon as individual variations. The fact that we do not assign them distinct specific names does not imply that we look upon such variations as void of interest.

I shall next consider the cranial characters and proportions of the species.

M. Fischer states that the male has a longer and narrower beak than the female. His tables give the following proportions:

Delphinus delphis. Females. (*From Fischer.*)

Description.	Total length of skull.	Per cent. of length of beak to total length.	Per cent. of width of beak at middle to its length.
	Cm		
Delphinus delphis, "balteatus B," jr ..	36.3*	55.1	20.0
"fusus C," jr	37.8	56.9	20.9
"balteatus C," jr ..	39.3	54.7	18.6
"fusus E"	42.8	59.6	21.6
"variegatus B"	43.3	57.7	20.0
"balteatus A"	43.3	58.9	21.6
"fusus F"	44.8	59.6	22.5
"variegatus A" ...	45.3	60.7	18.2
"fusus B"	47.3	61.1	17.3

* M. Fischer having taken his measurements of the total length from the foramen magnum, while mine are from the surface of the condyles, I have added 1.3^{cm} in each case to make the measurements agree.

We learn from this table that, in a general way, the beak is proportionally longest in the largest, most nearly adult, skull; also that the proportion of the width of the beak to its length is not co-ordinated with the absolute size of the skull. The longest beaks are not always the narrowest.

The shortest beak in this series of females is in length 54.7 per cent. of the total; the longest, 61.1 per cent. The widest beak has a breadth equaling 22.5 per cent. of its length, and the narrowest 17.3 per cent. The average length of the beaks for the three largest skulls is 60.5 per cent.; for the whole series, 58.3. The average width of the three largest is 19.3 per cent.; for the whole series, 20.1.

M. Fischer gives measurements of only two males. The proportions of the beak in these and one additional male in the national collection are shown in the following table:

Description.	Total length of skull.	Per cent. of length of beak to total length.	Per cent. of width of beak at its middle to its length.
	Cm.		
Delphinus delphis, "fusus D" (Fischer)	46.3	59.4	18.1
"fusus" 411 (U. S. N. M.)..	48.0	62.5	20.1
"fusus A" (Fischer)	49.8	61.3	16.6

In these three specimens again we find that there is no correlation between the width of the beak and the absolute size.

The length of the longest beak is 62.5 per cent. of the total, or a little more than that of the longest-beaked female. The average proportional length of the beak is also a little more than in the three largest females, viz, 61.1 per cent. The widest beak has a breadth equaling 20.1 per cent. of its absolute length, and the narrowest 16.6 per cent. The latter proportion is considerably less than in the females, while the average, 18.3 per cent., is also less.

M. Fischer's generalization is borne out by these percentages, but it should be remembered that two of the three males here considered are absolutely larger than any of the females. Since the percentage of the length of the beak rises with the absolute size of the skulls, if the females reach the same size as the males, it appears to me probable that males and females of the same absolute size would give the same percentages of length of beak. This opinion receives some support from the fact that M. Fischer's male "*fusus* D," which is absolutely larger than any of the females except "*fusus* B," has a relatively shorter beak than three of the females.

In addition to the individuals already discussed, I have myself measured a considerable number of similar skulls in the Muséum d'Histoire Naturelle, the British Museum, and elsewhere. In many cases the localities are not given.

In the following table all these specimens are brought together for comparison:

Reference number.	Catalogue number.	Collection.	Locality.	Sex and age.	Total length.	Length of beak.	Breadth of beak at base of notches.	Breadth of beak at its middle.	Breadth of intermaxillæ at same point.	Greatest breadth between outer margins of intermaxillæ proximally.
					Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*
1	*a*3079	Paris Mus		Young	37.4	22.1	8.4	4.6	.....	.....
2	15781	U. S. Nat. Mus	New York Bay	do	41.2	25.3	8.2	4.9	2.2	7.1
3	3885	do	Unknown		42.0	25.2	8.5	5.2	2.1	7.0
4	7063	do	New York Harbor		43.3	26.6	9.0	4.5	2.3	7.1
5	*a*3073	Paris Mus	Unknown	Adult.	43.8	27.4	9.2	5.1	.....	.....
6	*a*3072	do	Coast of Hérault	do	44.5	27.4	8.9	5.1	.....	.....
7	*a*3075	do	Unknown	do	44.5	27.2	9.2	5.6	.....	.....
8	*a*3077	do	Coast of Algeria, 1874.	do	44.5	27.2	8.9	5.1	.....	.....
9	*a*3088	do	Coast of Algeria	do	45.0	28.2	8.6	4.8	.....	.....
10	*a*3074	do	Unknown	do	45.5	28.0	9.4	5.6	.....	.....
11	318*f* "b".	British Mus			45.7	28.2	9.1	5.3	2.3	8.0
		Liverpool Pub. Mus.	do	Old	46.4	29.0	10.2	5.7	2.9	.....
12	20873	U. S. Nat. Mus	Off Block I'd, R.I	Adult.	46.7	28.2	9.3	5.3	2.3	7.4
13	574*b*	Cambridge Zool. Mus.	Sydney Museum		46.7	29.5	10.0	5.2	2.2	7.0
14	*a*3081	Paris Mus	Unknown	Adult.	46.8	28.7	9.9	6.1	.....	.....
15	574*a*	Cambridge Zool. Mus.	Bahama Islands		47.4	29.2	10.2	5.6	2.4	7.6

Catalogue number.	Length of tooth-line.	Last tooth to base of maxillary notch.	Extremity of beak at— Anterior margin of superior nares.	Extremity of beak at— End of crest of pterygoid.	Breadth between— Orbits.	Breadth between— Hinder margins of temporal fossæ.	Temporal fossæ. Length.	Temporal fossæ. Depth.	Length of mandible.	Length of symphysis of mandible.	Length of tooth-row of mandible.	Depth between angle and coronoid process.		Number of teeth.
	Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*
*a*3079	.....	.....	.....	.....	15.5	.....	.....	.....	.....	.....	.....	.....	.....	.....
15781	21.6	4.1	29.7	.....	16.3	13.9	6.9	4.9	35.5	.....	.....	6.6	.....	?–49 47–47
3885	20.1	6.0	30.0	30.5	16.6	14.5	7.1	5.2	35.3	.....	.....	6.7	.....	?45–45? 46–46
7063	22.6	4.9	30.7	32.2	16.1	14.4	7.1	5.3	.....	.....	.....	6.6	.....	49–49 50–48
*a*3073	.....	.....	.....	.....	16.0	.....	.....	.....	.....	.....	.....	.....	.....	.....
*a*3072	.....	.....	.....	.....	16.8	.....	.....	.....	.....	.....	.....	.....	.....	.....
*a*3075	.....	.....	.....	.....	17.0	.....	.....	.....	.....	.....	.....	.....	.....	.....
*a*3077	.....	.....	.....	.....	16.3	.....	.....	.....	.....	.....	.....	.....	.....	.....
*a*3088	.....	.....	.....	.....	16.0	.....	.....	.....	.....	.....	.....	.....	.....	.....
*a*3074	.....	.....	.....	.....	17.5	.....	.....	.....	.....	.....	.....	.....	.....	.....
318	24.1	4.8	32.5	.....	17.3	14.2	7.0	6.2	38.5	5.3	16.1	7.1	.....	50–50 51–50
	24.1	.....	33.4	.....	17.8	14.0	.....	.....	39.4	.....	.....	.....	.....	?51–?52 48–49
20873	23.3	5.7	32.8	34.2	17.1	14.4	7.2	5.4	.....	.....	.....	.....	.....	48–48
574*b*	22.9	.....	33.6	35.2	16.8	13.8	7.8	5.8	38.9	6.4	.....	.....	.....	51–51* 48–50
*a*3081	.....	.....	.....	.....	18.5	.....	.....	.....	.....	.....	.....	.....	.....	.....
574*a*	.....	.....	34.8	35.5	17.6	13.8	7.5	5.8	.....	.....	.....	.....	.....	?–47 ?–49

* Three extra teeth behind forming a double row.

Delphinus moyeri Gray.

Among the skulls resembling *D. delphis* in the various European museums are some which have been made the types of distinct species. Among these species are *D. bairdii*, *D. moyeri*, *D. [illegible]rostris*, *D. [illegible]ris*, *D. [illegible]ris*, *D. [illegible]ris*, and *D. [illegible]ris*. It now becomes necessary to consider these specimens, in order to determine whether they are to be regarded as identical with *D. delphis* or as distinct.

I will first take up *Delphinus moyeri* Gray, Cat. Seals and Whales, 1866, p. [illegible].

Gray's first character is: "Skull larger than that of *D. delphis*." The total length, according to my measurements, is [illegible]. This exceeds by [illegible] Fischer's largest specimen of *D. delphis* (*D. d. fasciatus* Auct.). Another character lies in the length of the beak, which exceeds three times the width of the beak at the base. This proportion holds true of five of M. Fischer's eleven females of *D. delphis* and of one of the two males. The depth and width of the palatal grooves is a third character in Gray's diagnosis. Regarding this character I can only say that my observation teaches me that the grooves vary more or less in depth and width in different specimens of *D. delphis* and that I cannot, therefore, consider the variation as of special importance.

I compared the type skull No. 1[illegible]a, Brit. Mus. in the British Museum with skulls of *D. delphis*, and have since compared the photographs of the same, which I was permitted to have made, with skulls in the National Museum. As a result, I cannot find characters which seem to me of importance as distinguishing the skull from those of *D. delphis*. The rostrum is rather narrower than is common in *D. delphis*, and the anterior border is less concave, but these are details which are not of great importance.

As regards proportions, the skull of *D. moyeri* has a relatively longer and narrower beak and narrower brain case than the majority of *D. delphis* which I have examined. It is, however, approached very closely by the [illegible] skull, No. [illegible], Mus. d'Hist. nat., from the coast of Algeria (see Table, p. [illegible], No. 9). The proportions in the two skulls are as follows:

[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

There is plainly considerable difference even here, but the approximation is such that in default of finding good characters for *D. major*, I am unable to regard it other than as a large individual of *D. delphis*.

Skull No. 1625a, in the collection of the British Museum.

Among the skulls differing from the ordinary *D. delphis* in some respects is one in the British Museum, No. 1625*a*, labeled *D. longirostris*. In this skull the pterygoids are somewhat broader at the free extremity than is usual, and the breadth at the orbits is considerably less. This skull is 47^{cm} long, while the breadth at the orbits is but 14^{cm}. No. 574*a*, in the Cambridge Museum from the Bahamas (see Table, p. 48, No. 15), which is one of the skulls having the least width at the orbits, measures 17.6^{cm} at this point, though but 47.4^{cm} in total length. I am unable, however, to discover any other characters by which to separate it from *D. delphis*, and regard it inadvisable, therefore, to remove it from that species.

Delphinus fulvofasciatus Hombron and Jacquinot.

The type of *D. fulvofasciatus*, Hombron and Jacquinot, No. *a*3025, in the Paris Museum, from Hobart Town, Tasmania, differs from the *average D. delphis*, so far as I was able to determine, only in being somewhat broader across the orbits, as is also the case with No. *a*3071 in the same museum from Tasmania, and labeled *D. tasmaniensis*. The length of these skulls and the width at the orbits are compared in the following table with the same measurements of a skull also in the Paris Museum, from Algeria, and with No. 20873 in the U. S. National Museum, from Block Island:

Number.	Collection.	Locality.	Type of—	Total length.	Width at orbits.
				Cm.	*Cm.*
*a*3025	Mus. d'His. Nat.	Hobart Town	*D. fulvofasciatus*	44.5	17.3
*a*3071	...do	Tasmania	Labeled *D. tasmaniensis*	44.5	16.8
*a*3072	...do	Coast of Hérault		46.5	18.6
20873	U. S. N. M	Block Island, R. I		46.7	17.1

No. 15, in the table on p. 48, is of about the same proportions as the skull labeled *D. tasmaniensis*, but the locality is unknown; it may be also from Tasmania.

We have, however, Professor Flower's statement that he has examined a series of skeletons of (apparently) *D. delphis* from New Zealand waters and can find no characters by which to distinguish them from *D. delphis* from the coast of Europe.

The figure of the exterior of *D. fulvofasciatus* in the *Voyage au Pôle sud,*

Delphinus major Gray.

Among the skulls resembling *D. delphis* in the various European museums are some which have been made the types of distinct species. Among these species are *D. longirostris*, *major*, *fulvofasciatus*, *Moorei*, *Walkeri*, *janira*, and *Forsteri*. It now becomes our duty to consider these specimens, in order to determine whether they are to be regarded as identical with *D. delphis* or as distinct.

I will first take up *Delphinus major* Gray (Cat. Seals and Whales, 1866, p. 396).

Gray's first character is: "Skull larger than that of *D. delphis*." The total length, according to my measurements, is 52.7^{cm}. This exceeds by 6^{cm} Fischer's largest specimen of *D. delphis* (*D. d. fusus* A.). Another character lies in the length of the beak, which exceeds three times the width of the beak at the base. This relation holds true of five of M. Fischer's eleven females of *D. delphis* and of one of the two males. The depth and width of the palatal grooves is a third character in Gray's diagnosis. Regarding this character I can only say that my observation teaches me that the grooves vary more or less in depth and width in different specimens of *D. delphis*, and that I cannot, therefore, consider this variation as of special importance.

I compared the type-skull (No. 1472*a*, Brit. Mus.) in the British Museum with skulls of *D. delphis*, and have since compared the photograph of the same, which I was permitted to have made, with skulls in the National Museum. As a result, I cannot find character which seem to me of importance as distinguishing this skull from those of *D. delphis*. The mandible is rather narrower than is common in *D. delphis*, and the alveolar border is less concave, but these are details which are not of prime importance.

As regards proportions, the skull of *D. major* has a relatively longer and narrower beak and narrower brain-case than the majority of *D. delphis* which I have examined. It is, however, approached very closely by the much smaller skull, No. *a*3088, Mus. d'Hist. nat., from the coast of Algeria (see Table, p. 48, No. 9). The proportions in the two skulls are as follows:

Proportions.	*D. delphis*, No. *a*3088, Paris.	*D. major*, No. 1472*a*, type, Brit. Mus.
	Cm.	*Cm.*
Total length	45.0	52.7
	Per cent.	*Per cent.*
Proportion of length of beak to total length	62.7	63.8
Proportion of width of beak at middle to its length	17.0	16.6
Proportion of width at orbits to total length, minus length of beak	95.2	90.8

There is plainly considerable difference even here, but the approximation is such that in default of finding good characters for *D. major*, I am unable to regard it other than as a large individual of *D. delphis*.

Skull No. 1625a, in the collection of the British Museum.

Among the skulls differing from the ordinary *D. delphis* in some respects is one in the British Museum, No. 1625*a*, labeled *D. longirostris*. In this skull the pterygoids are somewhat broader at the free extremity than is usual, and the breadth at the orbits is considerably less. This skull is 47^{cm} long, while the breadth at the orbits is but 14^{cm}. No. 574*a*, in the Cambridge Museum from the Bahamas (see Table, p. 48, No. 15), which is one of the skulls having the least width at the orbits, measures 17.6^{cm} at this point, though but 47.4^{cm} in total length. I am unable, however, to discover any other characters by which to separate it from *D. delphis*, and regard it inadvisable, therefore, to remove it from that species.

Delphinus fulvofasciatus Hombron and Jacquinot.

The type of *D. fulvofasciatus*, Hombron and Jacquinot, No. *a*3025, in the Paris Museum, from Hobart Town, Tasmania, differs from the *average D. delphis*, so far as I was able to determine, only in being somewhat broader across the orbits, as is also the case with No. *a*3071 in the same museum from Tasmania, and labeled *D. tasmaniensis*. The length of these skulls and the width at the orbits are compared in the following table with the same measurements of a skull also in the Paris Museum, from Algeria, and with No. 20873 in the U. S. National Museum, from Block Island:

Number.	Collection.	Locality.	Type of—	Total length.	Width at orbits.
				Cm.	*Cm.*
*a*3025	Mus. d'His. Nat.	Hobart Town	*D. fulvofasciatus*	44.5	17.3
*a*3071	....do	Tasmania	Labeled *D. tasmaniensis*	44.5	16.8
*a*3072	....do	Coast of Hérault		46.5	18.6
20873	U. S. N. M	Block Island, R. I		46.7	17.1

No. 15, in the table on p. 48, is of about the same proportions as the skull labeled *D. tasmaniensis*, but the locality is unknown; it may be also from Tasmania.

We have, however, Professor Flower's statement that he has examined a series of skeletons of (apparently) *D. delphis* from New Zealand waters and can find no characters by which to distinguish them from *D. delphis* from the coast of Europe.

The figure of the exterior of *D. fulvofasciatus* in the *Voyage au Pôle sud*,

(Pl. XXI, Fig. 1), closely resembles drawing No. 1 in the national collection, described on p. 45, but with the following differences: The color of the light area of the sides in *fulvofasciatus* is pinkish, rather than yellow, and there is no appearance of the crossing of color below the dorsal fin, which is commonly characteristic of *D. delphis*. The white of the belly extends to the flukes, which is not a common disposition in *D. delphis;* it is represented, however, in our drawing No. 2 (see p. 46). Finally, the gray mark at the base of the pectoral extends to the angle of the mouth, rather than to the extremity of the mandible.

Measurements applied to the figure agree very closely with M. Fischer's measurements of *D. delphis* and of specimens of the same in the National Museum. The measurements given in the text* do not agree at all with the figure and are evidently from the dry skin, as would appear from the following remarks:† "*Ce dauphin a malheureusement perdu par la dessiccation et le montage quelques-uns de ses caractères.*"

I do not think that the differences pointed out are sufficient to warrant the separation of *fulvofasciatus* from *delphis*.

To the original description of *D. novæ-zealandiæ*, which Jacquinot and Pucheran regarded as probably the same as their *D. fulvofasciatus*, I have not had access.

D. Forsteri Gray.

Delphinus Forsteri, Gray, is founded upon a drawing made by the younger Forster. Forster's description of the individual from which this drawing was made is mostly taken up with generic and supergeneric characters.‡

The colors are described as follows:

Color supra virenti-fuscus s. ferreus, subtus albus. Macula exolete alba discum pinnarum dorsalis et pectoralium occupat, fascia alba trans rostrum.

Gray translates Forster's description (Cat. Seals and Whales, p. 248) and in the *Synopsis* (pl. 24) reproduces the drawing. The drawing does not agree exactly with the original description, the "fascia alba trans rostrum," for example, being replaced by a black band. The manner in which the fins and flukes are depicted would lead one to believe that the figure was from a specimen which had been dead for some time. The eye is entirely too large. The indications of color-markings are very unsatisfactory. I do not think that the figure is sufficiently accurate to merit serious consideration, but it may, perhaps, be pronounced an imperfect figure of *D. delphis*.

The "virenti-fuscus" of the back we find again in M. Fischer's figures, Pl. IV, fig. 1, and Pl. V, fig. 2.

As I have already stated, one of the specimens of *D. delphis* in the

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* Voyage au Pôle sud, Zoologie, III, 1853, p. 38.

† L. c., p. 37.

‡ Forster, Descriptionis animalium, etc., 1844, p. 280.

national collection, received from the U. S. Fish Commission, had a large white area on the dorsal fin, and the presence of "a small white spot on the disk of the dorsal and pectoral fin"* in *D. Forsteri* would, therefore, appear to have no special significance.

Delphinus janira Gray.

Another species which appears to be identical with *D. delphis* is *D. janira* of Gray. The type of this species, which is in the Bristol Institute, I did not have an opportunity to examine. I did, however, measure a skull in the British Museum, No. 1470*a*, which Gray labeled *D. janira*, and which agrees in every particular with the figure of the type in the Zoology of the *Erebus* and *Terror*, except that the beak is a little narrower and the opening between the intermaxillæ proximally runs back further and does not end so abruptly. This skull, which is 43.2^{cm} long, agrees very closely with No. 7063 in the National Museum, from New York Harbor (see table *infra*). Both seem to represent rather small and narrow-beaked individuals of *D. delphis*. Skulls Nos. 1470*b* and 1470*c* in the British Museum, the latter from Jamaica, and both labeled *D. janira*, are defective, but do not seem to differ from the two skulls just considered. These three skulls are rather small for their apparently mature age, but I see no reason why they should be regarded as other than small individuals of *D. delphis*. From these skulls we might be led to suppose that there was a small race of *D. delphis* peculiar to the West Indies, but the value of this supposition is lessened by the fact that the type-skull of *D. pomeegra*, Owen, the next species to be considered, which is like them in every particular, is from India.

Delphinus pomeegra Owen.

This skull, No. 1478*a*, in the British Museum, is quite defective. I was unable to find any characters by which it could be distinguished from the preceding. In the table on p. 56 are included measurements of this skull and of skulls of *D. janira*.

Delphinus Bairdii Dall.

Another species whose distinctness has been questioned is *Delphinus Bairdii* Dall (Proc. Cal. Acad. Sci., v, 1873, p. 12), founded on two skeletons of females from Cape Arguello, California. A male skeleton of this species from Santa Cruz, Cal., was forwarded to the National Museum and has a place in the register as No. 13802, but unfortunately the specimen has disappeared, and all efforts on my part to rediscover it have thus far proved fruitless. We have, however, in the national collection two skulls from the Pacific coast, presumably of this species. The smaller (No. 15403) was collected by Lieut. E. Bergland at the mouth of the San Gabriel River, on San Pedro Bay, considerably south of Point

* Gray, Catalogue, p. 248.

Arguello where the original specimens were obtained. The second skull (No. 22305) was obtained by Mr. Charles H. Townsend at Monterey. Both these skulls are defective; the smaller is young, while the larger is quite old. In so far as they present characters for comparison I find nothing by which to distinguish them from skulls of *D. delphis* from the Atlantic coast.

Mr. Dall was unfortunately unable to compare his skeleton with that of *D. delphis*, to which species *D. Bairdii*, if distinct, is undoubtedly most closely allied. We have, however, for comparison, the measurements of the exterior of the original specimens, given by Scammon (Marine Mamm., p. 100). I place such of these as are comparable by the side of measurements of *D. delphis* from the Atlantic coast. The conformity of the two series of measurements is certainly remarkable, and the lack of agreement is apparently not more than would be found to exist between four individuals of the same species.

Measurements.	*D. Bairdii* Point Arguello. ♀. Types.		*D. delphis.* Off No Man's Land, Mass. ♀. U. S. F. C.	*D. delphis.* Atlantic coast. ♀.
	No. 1.	No. 2.		
	Inches.	*Inches.*	*Inches.*	*Inches.*
Total length	79.5	81.0	75.5	79.0
Length of pectoral fin	12.0	12.0	11.5	12.0
Expansion of flukes	18.0	17.5	15.5	18.0
Longitudinal width of flukes	5.0	6.0	6.0	6.25
Height of dorsal fin	7.0	7.5	7.0	8.0
Extremity of snout to pectoral fin	20.0	20.0	18.0	18.0
Extremity of snout to dorsal fin	36.0	37.0	35.0	37.25
Extremity of snout to angle of mouth	11.5	12.75	11.0	10.6
Extremity of snout to eye	13.0	13.75	12.5	12.0
Extremity of snout to blowhole	14.0	15.0	14.0	13.0
Girth at the anus	27.5	25.5	22.5	.....
Girth at front of dorsal fin	40.0	39.0	39.0	.....
Depth of caudal peduncle at origin of flukes	3.0	4.0	3.8	3.5

Remembering that these measurements were made by different observers on opposite sides of the continent, I think it will be conceded that they agree as closely as would measurements of different individuals of *D. delphis* made by different persons.

Scammon's description (p. 99) might be applied to the drawings of East-coast specimens, which I have called Nos. 1 and 2 (see p. 45), except that the dark mark before the pectorals in the former is black instead of gray. It is represented as black, however, in M. Fischer's figure of *D. delphis* var. *soouerbianus*.*

There is also among the drawings in the department of mammals a pencil-sketch by Mr. Dall, in which the boundaries of the lines and areas of color correspond almost exactly in position with drawings Nos. 1 and 2.

From the evidence now obtainable I am unable to distinguish between

* Cétacés de France, Pl. IV, fig. 2.

D. delphis and *D. Bairdii*, and must, therefore, regard the latter as identical with the former.

Delphinus Moorei and *D. Walkeri*, Gray.

These two species are founded on two drawings and two skeletons now in the Liverpool Public Museum. Both species are from a point in the South Atlantic, in the vicinity of Tristan da Cunha. I examined the types and original drawings, and verified from the manuscript the measurements given by Gray.* The colors of *D. Moorei* in the original, somewhat crude sketch, are, beginning from below, as follows: Light pure slate-gray; darker greenish slate gray; black. The colors of *D. Walkeri* are: Dirty white; light pure slate-gray; dark pure slate gray; black. The skulls are, as Gray has said, "so similar that it is not easy to point out any difference in words." They appeared to me identical with those of *D. delphis*. The skeletons I was unable to examine in detail, but they are certainly not notably different from those of *D. delphis*.

The colors of these two individuals, as represented in the sketches, are clearly far from identical. Nor are they exactly like those of any figure of *D. delphis* which I have examined. Gray brings up an important issue when he says:

> Considering that the coloring of the animals shows that they represent two species, one is struck with the very small difference exhibited in the skull by species showing such marked external differences, and can only conclude by thinking how hasty we have been when we have referred skulls received from very distant parts of the world all to *Delphinus delphis*, etc.†

This is quite the converse of Fischer's opinion, namely:

> Je pense que le dauphin vulgaire, qui semble habiter presque toutes les mers du globe, présente d'innombrables races ou variétés.

But what are the facts in the case under consideration? On the one hand we have two crude sketches of dolphins (not the dolphins themselves, it should be remembered), similar to each other and to *D. delphis*, but not absolutely alike. On the other hand we have the two skulls of the same individuals exactly resembling each other and *D. delphis*. Do they represent distinct species or otherwise? Gray decides by the differences of color in the sketches and affirms that they are distinct, while he admits that the skulls are alike. Prof. Fischer, on the other hand, would probably hold that, the skulls being alike, the differences in color must be regarded partly as mistakes of the artist and partly as real variations by which the different social families of *D. delphis* are distinguished from one another.

There is one fact not taken into account by Gray which leads one to believe that the latter opinion is correct, namely, that the proportions of

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*Lütken (Danske Vidensk. Selsk. Skr., 6te Raek., 1889), states that these sketches were not made by Walker, but by Capt. Andréa.

†Cat. Seals and Whales, p. 398.

D. Moorei are identical with those of *D. delphis*. In the following table the measurements of *D. Moorei* are placed by the side of those derived from the No Man's Land specimen of the same sex (♀) already referred to (p. 53):

Measurements.	D. Moorei (from Gray). ♀.	D. delphis. No Man's Land, Mass. U. S. Nat. Mus. ♀.
	Ft. *In.*	*Ft.* *In.*
Mouth to tip of tail	6 3½	6 3½
Length of mouth	11	11
Length of snout	5½	5½
Snout to eye	13	12½
Snout to snout-hole	13	13½
Snout to pectoral fin	18½	18
Snout to back fin	33	35

The agreement here is very close. The measurements of *D. Walkeri*, which I did not see, are stated by Gray to be "nearly the same as in *D. Moorei*." We have, therefore, two dolphins agreeing with *D. delphis* in their skulls and proportions, but represented as differently colored. I believe that they should be looked upon as individuals of that species, inaccurately represented, or at the most as varieties of that species.

Delphinus algeriensis Loche.*

Professor Fischer regards this species as possibly belonging to *P. marginatus*, but in the coloration, which alone is described, it appears to me to most resemble *D. delphis*. It is larger than any of the specimens of which Professor Fischer has given the dimensions, but is equaled by Scammon's specimens of *D. Bairdii* (=*D. delphis*).

Delphinus albimanus Peale.†

There is in the National Museum a mounted skin, in a bad state of preservation and without a trace of the original coloration, which is recorded as the type of this species. It does not closely resemble Peale's figure of the species. Upon cutting open the head, I found only a portion of the mandible in position. This and the bones of the manus, which I also exposed by cutting away the skin, agree with those of *D. delphis*. We may, I think, fairly conclude that Peale's species represents one of the varieties of *D. delphis*, like *D. forsteri*, which have areas of white on the fins. The type was from ———.

* Loche, Revue et. Mag. de Zoologie, 2d ser., XII, 1860, pp. 474, 475, pl. 22, fig. 1.

† Peale, U. S. Explor. Exped., Mamm. and Ornith., 1st ed., 1848, p. 33; Cassin, 2d ed., 1858, p. 29, pl. 6, fig. 1.

Table of measurements.

DELPHINUS DELPHIS.

Catalogue number.	Collection.	Type of—	Locality.	Sex and age.	Total length.	Length of beak.	Breadth of beak— At base of max. notches.	Breadth of beak— At its middle.	Breadth of intermaxillæ at middle of beak.	Greatest breadth between outer margins of intermaxillæ proximally.	Length of tooth-line.	Last tooth to base of maxillary notch.	Extremity of beak to— Anterior margin of superior nares.	Extremity of beak to— End of crest of pterygoid.	Breadth between— Orbits.	Breadth between— Hinder margins of temporal fossæ.	Temporal fossæ. Length.	Temporal fossæ. Depth.	Length of mandible.	Length of symphysis of mandible.	Length of tooth-row of mandible.	Depth between angle and coronoid process.	Diameter of largest tooth at base of crown.	Number of teeth.
					Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	
7063	U. S. N. M		New York Harbor.		43.3	26.6	9.0	4.5	2.3	7.1	22.6	4.9	30.7	32.2	16.1	14.4	7.1	5.3				6.6		49—49 50—48
20873	do		Wood's Holl, Mass.		46.7	28.2	9.3	5.3	2.3	7.4	23.3	5.7	32.8	34.2	17.1	14.4	7.2	5.4						48—48 — —
3885	do				42.0	25.2	8.5	5.2	2.1	7.0	20.1	6.0	30.0	30.5	12.6	14.5	7.1	5.2	35.3			6.7		45?—45? 46—46
15781	do			Jr	41.2	25.3	8.2	4.9	2.2	7.1	21.6	4.1	29.7		16.3	13.9	6.9	4.9	35.5			6.6		?—49 47—47
1470*a*	Brit. Mus	*D. janira*	"Zool. Soc."		43.2	25.9	9.1	4.8	2.2	7.3	22.6	4.7	31.5	32.8	16.4	14.1	6.4	5.1					0.25	[1]51—50 ?—?
1470*b*	do	do	Jamaica		[2]40.4	[2]22.9	9.5	5.2	2.4	7.6	(?)		[2]27.1		17.0	14.4	7.1	5.5						
1470*c*	do	do	do		[2]40.6	[2]23.9	9.3	4.8	2.1	7.1	[2]20.3	3.9	[2]28.2		15.4	[4]13.2	6.5	4.7					0.25	45+—45+ ?—?
1478*a*	do	*D. pomeegra*	India			[5]24.1	9.3	4.9	2.0	7.1	[5]20.1	5.1	[5]28.9		15.9	14.0	6.6	5.5					0.25	42+—42+ ?—?
[6]1478	do	do	do																40.6	6.1	23.5	7.2		
Walkeri No. 1.	Liverpool Pub. Mus.	*D. Moorei*			43.2	26.9	8.6	5.1	2.0		23.0		31.7		16.4	14.6	6.6	4.4	37.1					47—48 51—48
Walkeri No. 2.	do	*D. Walkeri*			42.2	26.7	8.6	4.5	2.2		22.2		31.2		16.5	13.1								50—51 ?—?
1650*a*	Brit. Mus.[7]		New Zealand		45.7	28.9	9.9	5.3	23.4	7.6	24.7	5.1	34.3	35.3	17.0	14.0	7.4	5.3	40.0	5.3	15.9	6.6		50—50 48—47
348*f*	do				45.7	28.2	9.2	5.3	2.3	8.0	24.1	4.8	32.5		17.3	14.2	7.0	6.2	38.5	5.3	16.2	7.1	0.25	50—50 51—50

1625*a*	Brit. Mus.[8]		South Seas.		47.0	29.2	9.2	4.8	2.3	7.8	24.9	4.8	31.0	34.9	14.0	14.0	7.5	6.0	39.4	5.7	16.5	6.6	0.25	42—42 46—47
1472*a*	.. do	*D. major*			52.7	33.6	10.5	5.6	2.5	7.6	28.7	5.7	38.5	39.4	17.3	14.1	8.4	6.6	44.4	6.2	26.7	....	0.32	48—50 46—50
(*b*)	Liverpool Pub. Mus.				46.3	29.0	10.2	5.7	2.9	.....	24.1	....	33.4	.....	17.8	14.0	.....	.....	39.3	....	....	....	..	?51—?52 48—49
574*b*	Cambridge Mus.[9]				46.7	29.5	10.0	5.2	2.2	7.0	22.9	....	33.6	35.2	16.8	13.8	7.8	5.8	38.9	6.4	....	....	..	51—54 48—50
574*a*	...do		Bahama Islands.		47.4	29.2	10.2	5.6	2.4	7.6	.....	.....	34.8	35.5	17.6	13.8	7.5	5.8	....	....	....	....	....	—?—47 ——49
3079*a*	Paris Mus			Jr	37.4	22.1	8.4	4.6	....	.....	.....	.....	.....	.....	15.5	.....	.....	.....	.....	.....	.....	.....	.....	.....
15781	U. S. Nat. Mus		New York Bay	do	41.9	25.3	8.2	4.9	2.2	7.1	21.6	4.1	29.7	.....	16.3	13.9	6.9	4.9	35.5	....	...	6.6	...	—?—49 47—47
3885	...do		Unknown		42.0	25.2	8.5	5.2	2.1	7.0	20.1	6.0	30.0	30.5	16.6	14.5	7.1	5.2	35.3	....	....	6.7	....	?45—45? 46—46
7063	....do		N. Y. Harbor		43.3	26.6	9.0	4.5	2.3	7.1	22.6	4.9	30.7	23.2	16.1	14.4	7.1	5.3	..	....	..	6.6	....	49—49 50—48
3073*a*	Paris Mus ...		Unknown	Ad	43.8	27.4	9.2	5.1	....	.....	.....	.....	.....	.....	16.0	.....	.....	.....	.....	.....	.....	.....	.....	.....
3072*a*	....do		Coast of Hérault	do	44.5	27.4	8.9	5.1	....	.....	.....	.....	.....	.....	16.8	.....	.....	.....	.....	.....	.....	.....	.....	.....
3075*a*	....do		Unknown.	do	44.5	27.2	9.2	5.6	....	.....	.....	.....	.....	.....	17.0	.....	.....	.....	.....	.....	.....	.....	.....	.....
3077*a*	... do		Coast of Algeria, 1874.	do	44.5	27.2	8.9	5.1	....	.....	.....	.....	.....	.....	16.3	.....	.....	.....	.....	.....	.....	.....	.....	.....
3088*a*	...do		Coast of Algeria	do	45.0	28.2	8.6	4.8	....	.....	.....	.....	.....	.....	16.0	.....	.....	.....	.....	.....	.....	.....	.....	.....
3074*a*	.. do		Unknown	do	45.5	28.0	9.4	5.6	....	.....	.....	.....	.....	.....	17.5	.....	.....	.....	.....	.....	.....	.....	.....	.....
318*f*	British Mus ..				45.7	28.2	9.1	5.3	2.3	8.0	24.1	4.8	32.5	.....	17.3	14.2	7.0	6.2	38.5	5.3	16.1	7.1	...	50—50 5.—50
"b"	Liverpool Pub. Mus.		Unknown	Old	46.4	29.0	10.2	5.7	2.9	.....	24.1	....	33.4	.....	17.8	14.0	.....	.....	39.4	....	....	....	....	?51—?52 48—49
20873	U. S. Nat. Mus		Off Block I'd, R. I.	Ad	46.7	28.2	9.3	5.3	2.3	7.4	23.3	5.7	32.8	34.2	17.1	14.4	7.2	5.4	....	....	....	....	....	48—48
574*a*	Cambridge Mus.		Sydney Mus ..	....	46.7	29.5	10.0	5.2	2.2	7.0	22.9	....	33.6	35.2	16.8	13.8	7.8	5.8	38.9	6.4	....	....	....	51—54* 48—50
81*b*	Paris Mus		Unknown	Ad	46.8	28.7	9.9	6.1	....	.....	.....	..	.....	.....	18.5	.....	.....	.....	.....	.....	.....	.....	.....	.....
3574*a*	Cambridge Mus.		Bahama Isl'ds.	....	47.4	29.2	10.2	5.6	2.4	7.6	.....	.....	34.8	35.5	17.6	13.8	7.5	5.8	....	..	..	....	....	—?—47 —?—49

[1] May be three or more small teeth on each side.
[2] Tip of beak broken; must add at least 3cm.
[3] Tip of beak broken; must add about 1.5cm.
[4] Twice one-half the width; the fossæ are broken.
[5] Tip of beak broken; must add at least 7cm.
[6] This mandible is from a different individual from the type-skull.
[7] Labeled D. Forsteri.
[8] Labeled D. longirostris.
[9] From Sydney Museum.

DELPHINUS LONGIROSTRIS Cuvier (ex Dussumier).

Delphinus longirostris Dussumier, Cuvier, Règne Animal, 2d ed., 1829, p. 288; Gervais, Ostéog. des Cétacés, 1880, p. 604, Pl. XXXIX, figs. 10, 11.

The name *Delphinus longirostris* was employed by Gray in the Spicilegia Zoologica a year prior to the publication of the second edition of the Règne Animal, but it appears that Gray's specimen really belonged to another genus, viz, *Prodelphinus*,* and there is therefore no impropriety in retaining for the long-beaked, many-toothed *Delphinus* the name which Cuvier took from Dussumier's manuscripts. There is some question, however, as to the specimen which Cuvier had in mind, and the determination of this point is made the more necessary by Professor Flower's recent interesting discovery that the specimen which Gray made the type of his *D. capensis* is a true *Delphinus*, with a longer beak and more numerous teeth than *D. delphis* (*List*, p. 26).

Cuvier's diagnosis of the species, if diagnosis it may be termed, is very brief. He simply states that it "surpasses even the common dolphin in the number of its teeth, having from fifty-five to sixty throughout. From the coast of Malabar."† There is in the Paris Museum a skull, No. *a*3065, labeled "*Eudelphinus longirostris*, Malabar. Dussumier, 1827." This is undoubtedly the skull figured by Van Beneden and Gervais (Ostéog., Pl. XXXIX, figs. 10, 11), but those authors give the number of teeth as $\frac{55-55}{54-53}$,‡ although their figure shows 65–63 teeth in the upper jaw. In the same skull I counted 65–65 teeth in the upper jaw. Pucheran, on the other hand, gives the formula $\frac{55-55}{53-54}$, corresponding to that given by Van Beneden and Gervais in the text, except that the number on the left and right sides of the mandible, respectively, is reversed.

No mention is made of this species in the first edition of the Règne Animal; it appears for the first time in the second edition, of which the first volume was issued in 1829, two years later than the date on the label of Dussumier's specimen. From the evidence at command I believe that the skull which I examined is identical with that which Cuvier had in mind.

Whether this species is identical with Gray's *D. capensis* (Spic. Zool., 1828, p. 2) remains to be determined. If such proves to be the case, Gray's name will have to be adopted for the species. Professor Flower

* Pucheran (Rev. and Mag. de Zoologie, 1856, 452) is at a loss to understand how Gray could apply the terms "osse palatino carinato" (Spicilegia, p. 2) to a skull in which the "palate" is flat, but had he studied the matter more closely I think he would have concluded, as I have, that Gray's term "palate-bone" means in reality the pterygoid.

† McMurtrie, Cuvier's Animal Kingdom, i, 1831, p. 202. The original second edition of the Règne Animal is not at command.

‡ Ostéog., p. 604.

states that the skull which he extracted from the type-skin of *D. capensis* has a longer beak than any other *Delphinus* in the collection, but he does not specify whether absolute or relative length is intended and does not give the number of teeth.

The skull No. *a*3065, which I believe to be the type of *D. longirostris*, is certainly different from that of *D. delphis*. The skull is 49:5^{cm} long, the beak being 67.9 per cent. of this length, a proportion not reached by any skulls of *D. delphis* which I have examined. It is also much narrower across the orbits, and the teeth, as already stated, are more numerous, viz, $\frac{65-65}{57-58}$. The temporal fossæ are large and rounded, the pterygoids very narrow and sharply keeled. The palatine grooves are very deep, the intermaxillæ are very high near the notch, and are rounded. The specimen does not appear to be old. I did not find any other which I thought specifically identical with it.

Table of measurements.

DELPHINUS LONGIROSTRIS.

Catalogue number.	Collection.	Type of—	Locality.	Sex and age.	Total length.	Length of beak.	Breadth of beak —		Breadth of intermaxillæ at middle of beak.	Greatest breadth between outer margins of intermaxillæ proximally.
							At base of maxillary notches.	At its middle.		
*a*3065	Mus. d'Hist. nat.	*D. longirostris*..	Malabar ..	Ad.	*Cm.* 49.5	*Cm.* 33.7	*Cm.* 8.4	*Cm.* 3.8	*Cm.* 2.0	*Cm.* 7.4

Catalogue number.	Length of tooth-line.	Last tooth to base of maxillary notch.	Extremity of beak to—		Breadth between—		Temporal fossæ.		Length of mandible.	Length of symphysis of mandible.	Length of tooth-row of mandible.	Depth between angle and coronoid process.	Breadth of anterior nares.	Number of teeth.
			Anterior margin of superior nares.	End of crest of pterygoid.	Orbits.	Hinder margins of temporal fossæ.	Length.	Depth.						
	Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*
*a*3065	30.2	4.7	38.1	38.8	14.7	12.9	7.4	6.1	43.7	9.9	.....	6.3	4.6	$\frac{65-65}{57-58}$

DELPHINUS CAPENSIS Gray.

Delphinus capensis, Gray, Spicilegia Zoologica, 1, 1828, p. 2.

For remarks upon this species, see p. 58.

DELPHINUS ROSEIVENTRIS Wagner.*

Delphinus roseiventris, Wagner, Schreber's Säugeth., Pl. CCCLX, fig. 1.
Dauphin à ventre rose, Jacquinot & Pucheran, Zool. Voyage Astrolabe et Zélée, iii, 1853, p. 39; Atlas, Pl. 22, fig. 2, Pl. 23, figs. 3–4.

I am led to retain this species in the genus *Delphinus* (restricted) on account of the form of the palate and the style of coloration of the exterior.

Pucheran and Jacquinot had three skulls before them when at work upon their account of the species. Two of these skulls, Nos. *a*3026 and *a*3027, are in the Paris Museum; the third (apparently) is No. 569 of the museum of Cambridge University. There are figures of both skull and exterior in the atlas of the voyage, and the former is also figured in Messrs. Van Beneden and Gervais' Ostéographie, Pl. XXXVIII, figs. 6 and 6*a*.

The skulls are peculiar for their small size and the uneveness of the surface of the different bones. The palate shows a condition in some measure intermediate between that found in *Prodelphinus* and that characteristic of *Delphinus*. The pterygoids are narrow and small, as in *Delphinus*, and a distinctly marked channel extends on either side of them nearly to the extremity of the beak. These channels are in no wise so deep, however, as in *D. delphis* or *D. longirostris*

In proportions it differs from the other species of the genus. Its small absolute size would alone serve to distinguish it from the remaining species.

Table of measurements.

DELPHINUS ROSEIVENTRIS.

Catalogue number.	Collection.	Type of—	Locality.	Sex and age.	Total length.	Length of beak.	Breadth of beak—		Breadth of intermaxillæ at middle of beak.	Greatest breadth between outer margins of intermaxillæ proximally.
							At base of maxillary notches.	At its middle.		
					Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*
*a*3026	Mus. d'Hist. nat.†	*D. roseiventris*	.....	.....	37.5	24.4	7.1	3.9	1.9	5.1
569	Cambridge Mus.‡	....do	Torres Strs	.....	35.4	22.8	6.3	3.6	1.8	5.3

* So far as I have been able to ascertain, the custom of citing Wagner as the authority for the name of this species has arisen simply from the fact that the name occurs on one of the plates which accompany the seventh part of Schreber's *Säugethiere*. The species is not mentioned in the text, nor even in the list of plates.

† L'Astrolabe, 1840.

‡ Voyage de l'Astrolabe.

Table of measurements—Continued.

Catalogue number.	Length of tooth-line.	Last tooth to base of maxillary notch.	Extremity of beak to—		Breadth between—		Temporal fossæ.		Length of mandible.	Length of symphysis of mandible.	Length of tooth-row of mandible.	Depth between angle and coronoid process.	Breadth of anterior nares.	Number of teeth
			Anterior margin of superior nares.	End of crest of pterygoid.	Orbits.	Hinder margins of temporal fossæ.	Length.	Depth.						
	Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	
a3026	21.6	3.3	27.9	.....	12.7	10.6	6.1	4.3	32.8	6.4	.....	5.3	3.2	$\frac{47+-}{48-?}$
569	20.3	.....	25.9	27.0	12.0	.....	.....	.....	30.0	5.3	.....	.....	.....	$\frac{48-48?}{45-45}$

5. PRODELPHINUS Gervais.

Prodelphinus, Gervais, Ostéog. des Cétacés, 1880, p. 604.

This genus is closely allied to *Delphinus* and *Tursiops*. The chief character which has been brought forward as separating it from *Delphinus* is a negative one—the absence of deep lateral palatine grooves. From *Tursiops* it is distinguished by its smaller and less numerous teeth and (generally) more numerous vertebræ. These latter characters, it must be confessed, are not very trenchant, and it may be found necessary at a later day to unite *Prodelphinus* with *Tursiops*.

The genus comprises a large number of nominal species, for the most part founded upon single skulls. Nearly every large collection contains a considerable number of skulls which may be assigned to this genus. It is found, however, in many cases that when a large number of these skulls is brought together they tend to form continuous series. The differences between the extremes of these series are often striking and perfectly definable, but in the middle they melt away and elude definition. From this fact and from the absence of material the task of revising the species of this genus is a very difficult and disheartening one. Professor Flower has, however, led the way (in the *Characters and Divisions* and also in the *List*) to a better knowledge of the group, and in his opinions I for the most part concur.

In the succeeding pages I shall consider about 23 species which appear to me to belong to this genus, including some which have not been touched upon by Professor Flower. I bring together the names of all these species in the following table:

Prodelphinus cæruleo-albus (Meyen).
euphrosyne (Gray).
styx (Gray).
euphrosynoides (Gray).
Prodelphinus dorides (Gray).
tethyos (Gervais).
marginatus (Duvernoy).
dubius (Cuvier).

really separated they have yet, as Professor Flower has already said, to be detected.

In *D. marginatus*, Pucheran, we have for the first time in this genus an instance in which both the external and osteological characters are known. We are fortunate enough to have also complete data regarding three individuals of a closely allied species, *P. plagiodon*, Cope, and are able to point out the distinctions between the two species very satisfactorily (see p. 67). As regards the skull of *P. marginatus*, it so very closely resembles that of *P. euphrosyne*, both in size, proportions, and details of structure, that I am unable to find any ground for the separation of the species. Professor Flower and Dr. Fischer both advance the same opinion, though with some hesitation.

Clymene dorides and *Clymenia euphrosynoides*, Gray.

The type-skulls of these two species are of the same absolute length and exhibit the closest agreement in the relative proportions of parts. No one who has examined them side by side, can, I think, doubt that they represent the same species. They are smaller than the type of *P. euphrosyne*, but agree with that skull in proportions and details of structure. *C. euphrosynoides* was not described by Gray, and the name has therefore no validity except for those who hold that reference to a figure answers in the place of a description.

Table of measurements.

PRODELPHINUS EUPHROSYNE.

Catalogue number.	Collection.	Type of—	Locality.	Sex and age.	Total length.	Length of beak.	Breadth of beak—		Breadth of internaxillæ at middle of beak.	Greatest breadth between outer margins of intermaxillæ proximally.
							At base of maxillary notches.	At its middle.		
					Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*
1473a	Brit. Mus	*C. dorides*		...	43.8	25.4	11.1	5.7	3.1	8.0
351a	...do	*C. euphrosynoides.*		...	43.8	25.6	10.9	5.8	2.5	8.1
179	Roy. Vic. Hosp., Netley.		Jamaica	Ad.	43.6	25.2	10.4	5.2	2.3	7.8
n. n.	Norwich Mus	*P. euphrosyne.*		..	47.0	28.7	11.4	5.8	....	.....
n. n.	Mus. d'Hist. nat.	*D. marginatus.*	Dieppe	♂	47.5	29.2	11.7	6.3	3.3	9.2
a3021	...do	*D. tethyos*	Mouth of Orb	...	44.3	24.9	10.9	5.6	3.1	8.9
a3022	...do			....	41.9	24.4	10.7	5.6	2.3	7.6
a3023	...do		?Mediterranean	....	43.7	25.7	10.4	5.6	2.7	8.6
a3024	...do			...	46.2	27.5	11.6	6.6	3.1	8.3

PRODELPHINUS EUPHROSYNE (Gray).

Delphinus euphrosyne, Gray, Zool. Erebus and Terror, 1846, p. 40, Pl. XXII.
Delphinus styx, Gray, Zool. Erebus and Terror, 1846, p. 39, Pl. XXI.
Delphinus tethyos, Gervais, Bull. Soc. d'Agric. Hérault, XL, 1853, p. 150, pl. 1, figs. 1–4.
Delphinus marginatus, Pucheran, Revue et Mag. Zool., 2me sér., VIII, 1868, p. 545, pl. 25.
Tursio dorcides, Gray, Cat. Seals and Whales, 1866, p. 400.
Clymene dorides, Gray, P. Z. S., 1866, p. 214.
Clymenia euphrosynoides, Gray, Synop. Whales and Dolph., 1868, p. 6. (No description.)

The type of the species above named, together with three skulls in the Paris Museum (Nos. *a*3022–*a*3024), and skull No. 179 from Jamaica, in the collection of the Royal Victoria Hospital, Netley, agree well together, both as regards absolute size, relative proportions, and the disposition of parts. The length of the beak varies from 56.2 per cent. to 61.5 per cent. of the length of the entire skull. From the series which groups itself around the type of *P. doris* they are distinguished by their greater absolute size, relatively longer beak, broader intermaxillæ, and larger temporal fossæ, and by the possession of rather a larger number of teeth. It must be confessed, however, that the recognition of these and similar characters is rendered difficult, as already stated, on account of the blending of differences at the extremes of the series. The type *P. euphrosyne* in the Norwich Museum (where I examined it) is well figured in Gray's *Synopsis*, pl. 22. It appears to be the skull of an adult individual.

The type of *D. styx* is lost and we have only Gray's figure (*Synopsis*, pl. 21) to work from. The obliging secretary of the Royal United Service Institution informed me by letter that this skull, with others, had "long ago been disposed of." I agree with Professor Flower that *D. styx* is probably identical with *P. euphrosyne*. Indeed, Gray himself was inclined to take the same view (see the *Catalogue*, p. 250). There is little, however, except its rather large size by which to distinguish it from *P. doris*.

D. tethyos, Gervais, is founded on a single skull from Valreas, at the mouth of the Orb. It is broken behind and appears as if diseased along the frontal suture on the left side. The temporal fossæ are rounded. The pterygoids are not wide and have a sharp keel. Gervais compared this species only with *Delphinus delphis* and *Prodelphinus dubius* and *frœnatus*. Whether he regarded the two latter species (which he thought identical) as identical with or distinct from *P. euphrosyne* we have no means of knowing. At all events we lack the authority of his opinion for uniting *P. tethyos* with *P. euphrosyne*. On the other hand there seems equally to be no reason for regarding these species as distinct. If there are characters by which the skulls may be

marginatus. The dorsal fin is situated much farther back in *P. marginatus* than in *P. lateralis*.

The localities from which the different specimens were derived are far apart.

On account of the presence of these differences, real or apparent, and of others which may be perceived by comparison of the figures, it is not possible to unite the species at the present time.

Why Cassin should have regarded Peale's species as belonging to the genus *Lagenorhynchus* is not clear. The shape of the beak is certainly not characteristic of that genus. Since *Prodelphinus* is not distinguishable from *Delphinus* by external characters in the present state of knowledge, I have referred Peale's species to this genus with a mark of interrogation. Its close resemblance to *P. marginatus* externally is my chief reason for placing it here.

PRODELPHINUS PLAGIODON Cope.

Delphinus plagiodon, Cope, Proc. Acad. Nat. Sci. Phila., 1866, p. 296.

Complete data regarding three individuals belonging unquestionably to this species are at command. The skeletons, photographs of the exterior, certain of the viscera, and measurements of these specimens are in the collection of the National Museum. There is also a cast of one individual. One specimen, No. 22017, was captured off Hatteras, North Carolina, by the naturalist of the United States Fish Commission steamer *Albatross*. The second specimen, No. 15030, was purchased by the Smithsonian Institution from the fishermen of Pensacola, Fla., through Messrs. Warren & Stearns of that place. A description of this individual has been given by the writer in the Smithsonian Report for 1884 (pt. 2, pp. 317–324, Pls. I–VI). It is therein identified with *P. plagiodon* (Cope), which species is in turn regarded as apparently identical with *P. doris* (Gray). While, after further reflection and comparison of specimens, I am more than ever convinced of the correctness of the identification of the freshly-acquired specimens with *P. plagiodon* (Cope), on the other hand I begin to doubt whether the latter species should be regarded as identical with Gray's *Clymenia doris*. If the relative proportions of the species alone are considered, the two species do, indeed, appear to be identical, but when the absolute size is regarded the matter assumes a different aspect. The type-skull of *P. plagiodon* is from a youngish individual, yet it is larger than the type of *P. doris* or any of the skulls called *doris* or *dubius* in the collections of the British Museum, the Royal College of Surgeons, and the Museum d'Histoire naturelle. The Pensacola and Hatteras specimens, which are clearly not old (the epiphyses of the vertebral centra are not anchylosed), are still larger than the type of *P. plagiodon*. They exceed the type of *P. doris* in length by 2.55 inches and 2.3 inches, respectively. The Pensacola skull is more than an inch longer than the largest of the twenty-nine skulls of the

doris series which I examined in the European collections. Furthermore the teeth are considerably larger than in *P. frœnatus*. They measure 5^{mm} in diameter at the base, and but 4 to $4\frac{1}{4}$ are included in 26^{mm} (=1 Danish inch). In Dr. Lütken's specimens the teeth measured about 3^{mm} in diameter, and 5 to $5\frac{1}{2}$ were included in a Danish inch.

I am inclined to believe that *P. plagiodon* must be regarded as a larger species than *P. doris*, though the skulls of both are much alike in appearance.

The skull of *P. euphrosyne* differs from that of *P. plagiodon*, chiefly by its more numerous teeth and smaller temporal fossæ. The skeleton of the type of *P. marginatus* gives the following formula: C. 7; D. 15; L. 21; Ca. 23 = 76.

The two specimens of *P. plagiodon* give the following formulæ: No. 15030 ♂ Pensacola, Fla., C. 7; D. 14; L. 19; Ca. 29 = 69. No. 22017 ♂ Hatteras, N. C., C. 7; D. 14; L. 19; Ca. 28 = 68.

Other differences in the skeleton are as follows:

In *P. marginatus*.	In *P. plagiodon*.
(1) The third cervical vertebra is united to the second.	(1) It is free.
(2) The neural spines cease at the 68th vertebra.	(2) At the 60th vertebra.
(3) The transverse processes cease at the 63d vertebra.	(3) At the 54th vertebra.
(4) The foramina at the base of the transverse process begin at the 59th or 60th vertebra.	(4) At the 49th vertebra.
(5) The centra are flattened and oblong at the 68th vertebra.	(5) At the 61st vertebra.
(6) The anterior zygapophyses end at the 28th vertebra, and begin again at the 44th vertebra.	(6) They end at the 29th vertebra (as distinct processes) and begin again at 40th vertebra.
(7) The phalanges are as follows: I, 1; II, 8(+); III, 6; IV, 2; V, 0.	(7) As follows: I, 2; II, 9; III, 7; IV, 3; V, 1.

P. plagiodon is readily distinguishable from *P. marginatus* (= *P. euphrosyne*) externally by its spotted skin.

1. PRODELPHINUS MALAYANUS (Lesson).

Delphinus malayanus, Lesson, Voyage de la Coquille, Zool., I, pt. i, 1826, p. 184; atlas, pl. 9, fig. 5; Schlegel, Abhandl. Gebiete Zool., Hft. 1, 1841, p. 20, Pl. I and II, fig. 2; Pl. IV, fig. 3.

? *Delphinus brevimanus*, Wagner, Schreber's Säugeth., 1846, pl. 361, fig. 2.

? *Dauphin à petites pectorales*, Jacquinot & Pucheran, Voyage de la Astrolabe & Zélée, Mamm. & Ois., 1853, p. 38; atlas, pl. 21, fig. 2; pl. 23, figs. 7 and 8.

2. PRODELPHINUS ATTENUATUS (Gray).

Steno attenuatus, Gray, Zool. Ere. & Terr., 1846, p. 44, Pl. XXVIII.

Delphinus pseudodelphis, Wiegmann in Schreber's Säugeth., pl. 358; Wagner in do., 1846, p. 332; Schlegel, Abhandl. Gebiete Zool., Hft., I, 1841, p. 22.

Steno capensis, Gray, Proc. Zool. Soc., London, 1865, p. 522.

Clymene punctata, Gray, Proc. Zool. Soc., London, 1865, p. 738; Cat. Seals and Whales, 1866, p. 398, fig. 101.

3. PRODELPHINUS FRŒNATUS (F. Cuvier).

Delphinus frœnatus, F. Cuv., Mamm. de la Ménag., liv. 58, liv. 59; Hist. nat. des Cétacés, 1836, p. 155, pl. 10, fig. 1.
Delphinus frontalis, Dussumier, in Cuv. Règne Animal, I, p. 288. (*Fide* Wagner.)
Delphinus doris, Gray, Zool. Ere. & Terr., 1846, p. 39, Pl. xx.
? *Delphinus dubius*, G. Cuv., Ann. du Muséum, xix, 1812, p, 14.
Delphinus clymene, Gray, Cat. Seals and Whales, 1866, p. 249.
Clymenia normalis, Gray, Proc. Zool. Soc. London, 1866, p. 214.

The relationships of these three species (if such they be) are so close that I have thought best to consider them conjointly. Professor Flower has said (*List*, p. 30) that—

> Though single well-marked specimens of Gray's *Clymenia doris* and *Steno attenuatus* may be so unlike as to justify their being placed in distinct species, yet when a large series, such as those of the British Museum and College of Surgeons combined, are compared together, the two extremes pass so insensibly into each other that it is difficult to avoid the suspicion that the differences depend upon age, or sex, or on individual variation. Unfortunately these forms are known at present only by skulls. When the remaining parts of their organization can be correlated with them probably other specific distinctions will be demonstrated.

That it is unsound to combine all these nominal species at present appears from the fact that there are indications that the exterior of the individuals from which some three or four of the skulls were derived differed much in appearance.

In the atlas of the Voyage of the *Coquille* (pl. 9, fig. 5) is figured the exterior of a dolphin, taken between Java and Borneo, and in the text styled *D. malayanus*. With this species Schlegel, in the *Abhandlungen*, identifies a skull from Celebes, two skulls from Java, and a young individual, somewhat over one and one-half feet long, from Borneo. This individual appears to have been a suckling, as is indicated both by its size and by the fact that "it still had some hairs on the sides of the snout," and that the teeth were "still only incompletely broken through the gums." "The color is bluish-black gray, the under parts somewhat clearer." The skull from Celebes, which I examined, closely resembles the type of Gray's *C. attenuatus*, but is absolutely larger, with relatively longer beak and shorter tooth-row. The number of teeth is, however, nearly the same.

Of the individual which served for the type of *D. malayanus* of the *Coquille* no parts appear to have been brought home. The color is described as "uniformément cendrée."* It was 5 feet 11 inches (French) long.

It is, of course, impossible to determine whether Schlegel's identification of his specimens with *D. malayanus* was a correct one, but the young individual was at all events not unlike that species in color.

In the atlas of the Voyage of the *Astrolabe* and *Zélée* (pl. 21, fig. 2; pl. 23, figs. 7 and 8) are figured the skull and exterior of another dark

* All the figures on plate 9 of the atlas of the *Coquille* are colored bluish-green, ch is evidently not intended as the natural color.

gray species, called *Dauphin à petites pectorales*. Gray (*Catalogue*, page 236) states that it was from Banda, Singapore, but on what authority I have been unable to determine. In the figure of the exterior the pectoral fins are entirely too small. The measurements in the text agree well with those given by Lesson for *D. malayanus*. Furthermore, the skull figured on plate 23, figs. 7 and 8, very closely resembles the skull which Schlegel identified with *D. malayanus*. It is a little smaller and has rather smaller temporal fossæ, but otherwise agrees with Schlegel's skull in details of structure.

From such evidence as presents itself it seems to me probable that Schlegel was correct in his identification, and that *D. malayanus* Lesson and *D. brevimanus* Wagner are identical.

That this species is distinct from *P. attenuatus*, though closely related, is apparently indicated by the differences in the proportions derived from the measurements given on page 72.

In 1865 Gray, in the *Catalogue*, page 398, described a species under the name of *Clymene punctata* from a specimen in the Public Museum, Liverpool. Through the kindness of Mr. Moore, I examined the original material upon which this species was based. My time was so limited, however, that I could only examine and measure the skull and note the colors in the original sketch of the exterior.

The skull very closely resembles *P. frœnatus* both in size and proportions, and I think there can be little doubt that it is identical with the latter specifically. The exterior is as Gray figured it (*Catalogue*, page 398, fig. 101). The upper parts (see diagnosis, p. 166) are black, the under surface, the lower jaw, pectoral fin, and the band over the tail are very dark slate-gray. There are numerous white spots on the sides. The measurements and locality are correctly quoted by Gray from the original.

The exterior in this species is plainly different from that of *P. malayanus*, while, as already stated, the skull is precisely like *P. frœnatus*.

The skull of *P. attenuatus* closely resembles two others, namely, one called *D. pseudodelphis* Wiegmann, in the Leyden Museum, and the type *Steno capensis* Gray. I examined in the Leyden Museum a skull which in all probability is that referred to by Schlegel in the *Abhandlungen* as *D. pseudodelphis*. It closely resembles Gray's *S. attenuata*, and if Schlegel's identification is correct, *D. pseudodelphis* would, therefore, seem to be identical with Gray's species. If the identification can be proven correct, *pseudodelphis* would supplant *attenuata* as the name of the species under consideration.

The type-skull of *Steno capensis*, Gray, scarcely differs at all from *S. attenuata* except in size. It is about an inch longer than the type-skull of the latter species. Professor Flower holds that the two species are "not distinguishable" (*Char. and Div.*, p. 498), and there is every reason to regard this opinion as the correct one.

The evidence at command seems, therefore, to warrant the union of the three nominal species *D. pseudodelphis*, Wieg., *S. attenuata*, and *S. capensis* into one.

Prodelphinus frœnatus (F. Cuv.).

The two skulls in the Paris Museum labeled *P. frœnatus*, and presumably the types of that species, are precisely like the type-skull of *P. doris* (Gray). The exterior of *P. frœnatus* is different from that of *P. punctata* (=*P. attenuata*). It lacks the spots of the latter species, and the pectoral fins are black, like the back, rather than light-colored, like the belly.

I was formerly inclined to regard *Delphinus plagiodon* as probably synonymous with *P. doris* (=*P. frœnatus*). It is somewhat different in color, however, and the greater size of the skulls now at command appears to indicate that it is a somewhat larger species than *P. frœnatus*.

Supplementary remarks.

Dr. Lütken, in his recently-published contribution to the history of *Prodelphinus* and other genera, to which reference has already been made, gives much new information in regard to this very perplexing group of species.* He presents measurements and other data regarding four skeletons and three skulls of *P. doris* (=*P. frœnatus*), and the same regarding two skeletons which he identifies with *P. attenuatus*.

These two species have the following vertebral formulæ: *P. doris*, C. 7; D. 14; L. 16–18; Ca. 31–33=70. *P. attenuatus*, C. 7; D. 15; L. 21; Ca. 36–38=79–81.

One individual of *P. doris* is represented in a sketch by Captain Andréa as being dark on the back, white on the belly, and covered with very numerous spots. Another individual is represented as dark greenish-gray on the back, light gray on the belly, and with but few spots or streaks, which are confined to the region in front of the pectoral fin. There is a well-marked band between the pectoral fin and the forehead. (A copy of Dr. Lütken's figures is given in the plates. These figures are given only to show the color-marking; the outlines are diagrammatic.) *P. attenuatus* is represented as dark on the back and ashy-gray below.

Except as regards their different vertebral formulæ and the correlated disposition of the processes and foramina of the vertebræ, the specimens identified by Dr. Lütken as *P. attenuatus* might be placed under *P. frœnatus*. I am not aware, however, that any such considerable variations in the number of vertebræ as are here pointed out have been recorded as occurring among individuals of a single species.

* Lütken, K. Danske Vidensk. Selsk. Skrifter, 6te. Raekke, v, 1889.

Nevertheless, since the skulls and external proportions of the specimens identified by Dr. Lütken as *P. doris*, *attenuatus*, and *alope* are almost identical, the question naturally arises whether the difference in number of vertebræ may not possibly be due to individual variation.

It would be very interesting in this connection to know the vertebral formula of Gray's *P. punctatus*, the skull of which seems to me identical with the type-skull of *P. attenuatus*, but whose style of marking resembles Dr. Lütken's *P. doris*, No. 4. Since Dr. Lütken states that the types of Gray's *D. moorei* and *D. walkeri* (=*D. delphis*), which are labeled "Walker's No. 1" and "Walker's No. 2," were really obtained by Captain Andréa, it occurs to me that the type of *D. punctatus*, which is labeled "Walker's No. 3," may also have been obtained by Captain Andréa. It is from a point near the Cape Verde Islands, only a few miles distant from the place in which Dr. Lütken's *P. doris*, No. 2, was derived, and was probably caught in the same year.

The specimen which Dr. Lütken places under "*P. obscurus* (Gray)"* certainly does not belong to that species, which is, I believe, a *Lagenorhynchus*. In color this specimen seems to me intermediate between the two specimens figured on page 34.† In external proportions it agrees with *P. doris* No. 4,‡ and in skeletal proportions with this and other specimens on pages 32–33.

In conclusion, it may be said that it is necessary for the present to regard *P. attenuatus* as a distinct species, on account of its different vertebral formula.

The difference in color between *P. frœnatus* and Dr. Lütken's specimen of *P. doris* may be regarded as due to difference in age. As already stated, however, if it should be shown hereafter that the number of vertebræ is subject to variation, there is apparently no other reason why all the specimens should not be regarded as belonging in one variable species.

Op. cit., p. 42. †*Op. cit.* ‡*Op. cit.*, p. 31.

Table of measurements.

PRODELPHINUS MALAYANUS.

Catalogue number.	Collection.	Type of—	Locality.	Sex and age.	Total length.	Length of beak.	Breadth of beak— At base of maxillary notches.	Breadth of beak— At its middle.	Breadth of intermaxillary at middle of beak.	Greatest breadth between outer margins of intermaxillary proximally.	Length of tooth-line.	Last tooth to base of maxillare notch.	Extremity of beak to— Anterior margin of superior nares.	Extremity of beak to— End of crest of pterygoid.	Breadth between— Orbits.	Breadth between— Under margin of temporal fossæ.	Temporal fossæ. Length.	Temporal fossæ. Depth.	Length of mandible.	Length of symphysis of mandible.	Length of tooth row of mandible.	Depth between angle and coronoid process.		Number of teeth.
					Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*		
3028*a*	Mus. d'Hist. nat.	*D. brevimanus.*	Strs. of Malacca.	....	41.3	25.4	8.8	4.2	2.3	6.9	22.4	3.8	29.8	.....	15.8	13.2	5.9	4.8	34.9	7.1	....	....	....	41—38 41—40
5	Mus. Pays-Bas.	.....	Bet. Java and Celebes.	....	42.5	26.7	9.2	4.4	2.1	7.0	23.0	4.0	30.0	.....	....	12.5	6.9	5.2	....	7.5	....	....	....	39— 39—

PRODELPHINUS ATTENUATUS.

347*b*	Brit. Mus	*S. attenuatus.*	.....	....	38.3	22.9	8.7	3.8	2.0	6.1	19.2	4.3	26.2	.....	14.7	11.8	6.5	5.0	32.9	7.4	19.3	5.3	....	43—43 42—42
1519*a*	....do	*S. capensis.*	Cape Good Hope.	....	41.3	25.1	9.3	4.2	2.4	6.7	21.4	4.3	29.2	30.0	16.4	11.9	6.7	5.0	35.0	7.5	20.3	5.7	....	40—41 38—37
127	R. Vic. Hosp'l, Netley.	.....	.....	Ad.	36.8	25.4	[1]2.6	4.1	2.2	6.8	21.6	4.2	29.5	30.5	16.0	...	6.0	4.7	34.3	6.9	21.1	6.0	...	40—40 40—40
3	Mus. Pays-Bas.	.....	.....	...	39.2	24.4	9.3	4.1	2.3	7.4	20.5	4.2	28.0	.....	....	12.5	6.4	4.2	....	6.7	...	....	....	45— 41—

[1] Least.

352*a*	Brit. Mus.....	*D. doris*...	.....	....	39.3	23.5	9.4	5.0	2.8	7.4	20.3	4.1	26.9	28.7	16.4	13.1	7.1	5.3	33.9	6.3	19.3	6.1	....	38—34 34—34
22, 12, 69 1.	Liverpool Pub. Mus*.	.....	.....	....	40.6	21.8	8.9	4.4	2.5	.....	20.3	....	26.9	.....	16.5	13.1	7.0	5.1	....	....	....	....	....	36—36 34—36
	....do	.....	.....	....	41.3	24.8	8.6	4.1	3.6	.....	21.6	....	29.2	.....	15.2	12.7	6.1	.....	34.9	...	....	....	....	?37—?41 37—39
Walker's, No. 3.	Liverpool Pub. Mus.	*P. punctatus.*	Cape Verde Ids .	....	38.5	23.3	8.3	4.1	2.3	.....	20.3	....	26.4	.....	15.2	11.9	.....	.....	32.2	6.6	....	....	....	42—42 41—40
	....do	.....	.....	....	38.1	21.6	8.9	4.8	2.9	.....	18.4	...	25.0	.....	16.3	12.4	7.3	5.8	31.1	..	....	....	....	38—38 33—33
126	Roy. Vic. Hosp'l at Netley.	.....	Atlantic	Ad.	38.8	22.6	[1]9.0	5.1	2.8	7.1	19.0	3.9	25.4	26.9	18.2	13.1	6.6	5.3	33.4	[2]5.8	18 0	6.1	...	35—33 32—32
*a*3036	Mus. d'Hist. nat.	.....	.....	....	[2]40.6	25.2	[1]8.7	4.2	2.3	7.0	20.6	5.1	29.4	29.5	15.8	11.2	6.9	5.0	....	....	....	....	....	?44—?45 ?—?—
*a*3029	....do	.....	Indian Ocean ...	....	41.3	25.2	[1]8.7	4.2	2.3	6.6	21.9	3.7	29.5	31.0	15.4	12.8	5.8	5.0	34.9	7.9	..	5.6	...	?42—?41 37—38
*a*3030	....do	.....	.....	....	41.7	25.7	[1]9.2	4.1	2.2	6.7	22.1	4.5	29.5	.....	16.0	13.0	6.0	5.0	35.0	8.0	..	6.1	....	40—39 39—38
*a*3039	....do	.....	.....	....	41.3	25.4	[1]8.7	4.3	2.2	6.6	22.4	3.7	29.2	31.0	15.8	11.7	6.6	5.1	34.9	7.9	....	5.6	...	44—44 43—44
*a*3038	....do	.....	.....	....	40.9	24.0	[1]8.7	4.3	2.3	6.6	21.4	4.6	29.2	30.0	15.5	12.5	6.6	4.6	33.8	7.6	....	6.0	....	?41—?40 41—40
*a*3032	....do	.....	.....	Jr.	36.2	20.3	[1]8.5	4.3	2.3	6.6	17.8	3.6	24.2	.....	15.3	12.6	6.6	4.6	30.5	.....	....	5.9	....	37—37 37—37
*a*3027	....do	.....	Madagascar ...	....	38.8	23.1	8.7	4.5	2.5	6.3	19.7	4.2	26.9	28.0	15.4	12.2	6.3	4.3	.....	.....	.....	..	....	42—43 ?—?—
*a*3040	....do	.....	.....	....	41.3	25.4	8.7	4.1	2.3	6.9	21.9	..	30.0	30.7	15.0	12.5	6.3	4.8	.....	.....	.....	.....	....	39—38 ?—?—
*a*3031	....do	.....	Parages de S t. Hélène.	....	38.0	22.6	8.7	4.8	2.6	6.9	19.1	3.8	25.4	27.0	16.2	.....	6.9	5.3	32.4	5.3	....	5.8	...	37—38 36—35
*a*3056	.. do	.....	Indian Ocean ...	....	42.2	26.4	8.4	4.1	2.0	6.6	23.1	4.0	30.7	32.0	16.0	12.2	6.7	4.8	36.1	8.4	....	6.1	....	41—42 42—41
*a*3034	...do	*P. frœnatus.*	Cape Verde.....	....	37.5	21.4	8.7	4.7	2.6	7.1	18.6	3.7	24.9	27.2	15.3	12.4	6.9	4.3	31.8	5.9	....	6.1	....	36—37 34—35
*a*3033	....do	....do	....do	...	37.6	21.8	8.9	5.2	2.7	7.3	18.9	3.8	25.7	[3]6.9	16.4	12.7	7.1	5.0	32.0	5.9	..	6.3	....	37—38 36—35
*a*3035	....do	*P. frontalis*	....do	...	39.1	22.6	9.2	4.6	2.3	7.5	19.8	4.0	26.4	29.2	15.8	12.2	6.9	4.8	33.5	6.3	....	6.0	....	38—37 37—36

* From Mr. Tyerman.

[1] Least.

[2] Greatest.

[3] The beak is somewhat damaged at the tip.

Table of measurements—Continued.

PRODELPHINUS FRŒNATUS—Continued.

Catalogue number.	Collection.	Type of—	Locality.	Sex and age.	Total length.	Length of beak.	Breadth of beak— At base of maxillary notches.	Breadth of beak— At its middle.	Breadth of internaxillæ at middle of beak.	Greatest breadth between outer margins of intermaxillæ proximally.	Length of tooth-line.	Last tooth to base of maxillary notches.	Extremity of beak to— Anterior margin of superior narra.	Extremity of beak to— End of crest of pterygoid.	Breadth between— Orbits.	Breadth between— Hinder margin of temporal fossæ.	Temporal fossæ. Length.	Temporal fossæ. Depth.	Length of mandible.	Length of symphysis of mandible.	Length of tooth-row of mandible.	Depth between angle and coronoid process.	Number of teeth.
					Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	
576*l*	Cambridge Mus.				43.1	26.6	8.8	4.3	..	.....	...	...	...	.....	15.9	....	6.8	.....	.....	7.7	...	...	41— 41—
573	....do				40.4	24.3	8.6	4.0	....	.....	...	...	...	.....	16.0	....	6.6	.....	....	7.1	...	...	38— — 38— —
576*n*	....do				35.1	19.7	8.4	4.6	....	.....	...	...	...	.....	15.1	....	7.0	.....	....	4.7	...	...	34— — 34— —
576*i*	... do				37.7	21.2	9.0	5.3	....	.....	...	...	...	.....	16.2	....	6.7	.....	....	4.8	....	...	?32— ?38— —
1667	Oxford Mus.....			Ad.	38.3	22.6	8.3	4.8	2.5	6.3	19.6	3.6	26.1	.....	14.8	12.7	6.6	5.3	31.9	5.8	18.4	6.1	37— 38 37— 36
3032	R. Coll. Surg				40.3	24.7	8.9	3.8	2.2	7.0	20.9	3.8	28.7	29.8	15.7	12 3	6.3	5.2	34.3	....	20.6	5.7	40— 40 40— 40
3033	....do				40.0	24.4	8.8	4.1	2.5	6.3	20.3	4.9	28.7	30.0	15.2	11.9	7.0	4.4	33.6	....	20.0	5.7	?— 40 ?— 36
3034	....do				38.1	22.8	11.4.	3.8	2.2	6.0	19.2	4.8	16.0	.....	14.6	12.8	5.7	4.4	31.4	6.6	19.2	5.2	39— 39 38— 39
3035	....do				39.8	23.9	8.9	3.8	2.2	7.0	20.0	4.8	28.2	29.2	15.4	12.5	5.6	4.3	34.3	7.1	20.3	5.7	40— ? 40— 39
3036	....do				39.6	22.8	8.8	4.6	2.5	7.3	20.0	3.5	28.5	27.3	16.8	12.8	6.6	4.4	33.1	5.4	19.5	6.5	37— 36 35— 36
3038	....do				42.2	24.4	9.2.	5.1	2.5	7.6	21.2	3.8	30.5	28 2	16.5	13.9	7.0	4.4	35.5	6.3	20.6	5.8	35+—38 35 —37
350*a*	Brit. Mus.....	*D. clymene*	.....		39.1	23.9	8.9	5.3	2.5	6.9	19.7	4.8	27.3	29.5	16.2	13.3	4.7	3.6	..	...	...	.....	37— 40 ?— ?—

PRODELPHINUS LONGIROSTRIS (Gray).

Delphinus longirostris, Gray, Spic. Zool., 1828, p. 1.
Delphinus microps, Gray, Zool. Ere. & Terr., 1846, p. 42, pl. 25.
Delphinus alope, Gray, Cat. Cet. Brit. Mus., 1850, p. 118.
Delphinus stenorhynchus, Gray, Cat. Seals and Whales, 1866, p. 396.

This species is distinguishable from those of the same genus, which we have already considered, by the small size of the cranium as compared with the beak. In the *Characters and Divisions*, Professor Flower places the four names given in the foregoing synonymy in one of his sections of *Clymenia*. In the *List* he unites *stenorhynchus* with *longirostris*, and holds *alope* and *microps* as distinct species. Of the latter, however, he remarks that it is "probably the same as the next (*P. longirostris*)."

To the union of *stenorhynchus* and *longirostris* I subscribe with little hesitation. Furthermore, the specific identity of *stenorhynchus* and *microps* does not appear to me very doubtful. The type of *microps* is, however, somewhat smaller than the type of *stenorhynchus*, though both skulls seem to be of the same age. The intermaxillæ are a little narrowed in front of the "triangle" in the former species but not in the latter. The beak is relatively longest and narrowest in *stenorhynchus*. On the other hand, in the remaining proportions the two skulls are alike, and the teeth are equally numerous and similar in form; the pterygoid bones are alike in form, having flat sides and a very sharp keel. The difference in the proportional width of the intermaxillæ at the middle of the beak is due to the partial absorption of these bones in *P. stenorhynchus*.

The coronoid process of the mandible is strongly developed in both skulls. The roots of the teeth in *P. stenorhynchus* are flattened, a little thickened, and imperforate.

If *Delphinus alope* is to be kept separate it must be because of its relatively broader beak and keeled mandibular symphysis. There is, however, in the collection of the National Museum, a skull, No. 21168, which is intermediate in form between *alope* and *longirostris*, and binds these two species together. The beak is broader than in *longirostris* or *microps* but narrower than in *alope*, and the symphysis mandibuli is more strongly keeled than in the two former species, but less than in *alope*. The skull is nearly as large as that of *stenorhynchus* (see table of measurements, page 76).

The specimens described by Dr. Lütken in his recent work,* under the name of "*Prodelphinus alope*," are certainly not the *Delphinus alope* of Gray (=*P. longirostris* Gray). On the other hand, the skeleton described as "*P. longirostris* (Schl.)" does, I believe, belong to the species under consideration.

* Lütken, K. Danske Vidensk. Selsk., Skr., 6th Raekke, v, pt. 1, 1889, pp. 43–47.

The description given by Dr. Lütken * applies almost equally well to a skeleton recently collected by the naturalists of the U. S. Fish Commission Steamer *Albatross*, in the Pacific Ocean, between the Galapagos Islands and Panama. The vertebral formula in each is as follows:

Dr. Lütken's specimen ..... C. 7; D. 14; L. 17; Ca. 34=72
U. S. Nat. Mus., No. 23302 ..... C. 7; D. 14; L. 18; Ca. 34=75

The relations of the processes and foramina of the vertebræ are as follows:

	Dr. Lütken's specimen.	U. S. Nat. Mus., No. 23302.
First foramen perforans on vertebra number.....	48–49	48–49
Last distinct transverse process on vertebra number.	55	56
Last neural spine on vertebra number.....	61	62
Vertebræ without zygopophyses	11(=31–41)	10(=32–41)

The length of the pectoral fin in the specimen in the National Museum is 256mm. The formula of the phalanges is as follows: I, 2; II, 9; III, 7; IV, 3; V, 0.

The entire skin of this individual was not preserved, but the fins and a piece of skin from the side of the body were received with the skeleton. From these it appears that the dolphin was dark slate-gray above and white below. The darker color, which extends on to the fins, is everywhere mottled with very small blotches of a lighter gray. The white parts appear to have been covered with small streaks and stellate blotches of gray. Measurements of the skull will be found in the following table.

Table of measurements.

PRODELPHINUS LONGIROSTRIS.

Catalogue number.	Collection.	Type of—	Locality.	Sex and age.	Total length.	Length of beak.	Breadth of beak— At base of maxillary notches.	Breadth of beak— At its middle.	Breadth of intermaxillæ at middle of beak.	Greatest breadth between outer margins of intermaxillæ proximally.
					Cm.	Cm.	Cm.	Cm.	Cm.	Cm.
349a	Brit. Mus.....	*D. microps*	.....	....	39.4	25.3	6.5	4.3	2.0	6.1
1471a	...do	*D. stenorhynchus*	.....	....	45.1	30.3	8.4	4.3	2.0	6.9
847*b	...do	.....	.....	....	47.0	26.9	8.7	5.3	2.5	6.2
n. n	Norwich Mus...	.....	.....	Old.	44.2	29.1	7.6	4.2	.....	.....
a567	Cambridge Mus	.....	.....	....	44.0	29.0	8.4	4.6	2.2	6.4
30.59	R. Coll. Surg ...	.....	.....	....	42.2	27.3	7.6	4.5	2.1	6.4
12	Mus. Pays-Bas..	*D. longirostris*...	Cape Good Hope	....	42.0	28.0	7.5	4.6	2.1	5.5
14	....do	.....	....do	....	42.0	27.2	7.9	4.6	2.3	6.8
21168	U. S. Nat. Mus..	.....	.....	Ad.	43.6	28.5	8.6	5.2	2.3	6.5
23302	....do	.....	Near Panama...	....	39.4	25.1	8.05	4.5	2.05	6.0

* *Op. cit.*, pp. 47, 48.

Table of measurements—Continued.

Catalogue number.	Length of tooth-line.	Last tooth to base of maxillary notch.	Extremity of beak to—		Breadth between—		Temporal fossæ.		Length of mandible.	Length of symphysis of mandible.	Length of tooth-row of mandible.	Depth between angle and coronoid process.	Diameter of largest tooth.	Number of teeth.
			Anterior margin of superior nares.	End of crest of pterygoid.	Orbits.	Hinder margins of temporal fossæ.	Length.	Depth.						
	Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	
349*a*	22.8	3.6	29.2	30.5	13.0	11.7	4.7	3.7	34.3	5.6	21.7	5.6	0.24	{ 53—55 52—51
1471*a*	25.2	5.2	33.6	35.2	14.7	12.3	5.3	4.2	39.7	6.3	26.7	1.9	0.25	{ 53—56 56—56
8475*	23.1	3.8	30.9	31.7	15.4	12.8	5.6	4.1	36.0	6.1	23.4	5.9	0.19	{ 55—55 49—51
n. n.	.....	.....	.....	.....	14.6	13.1	5.6	4.2	37.5	7.6	....	.....	....	{ 48—48 49—49
*a*567	25.8	.....	33.0	34.4	15.0	12.8	5.4	4.3	.....	.....	.....	...	.....	{ ?58—?58 ?53—?53
3039	24.1	4.0	32.2	29.8	14.0	12.1	5.3	4.1	36.2	4.8	23.5	5.4	.....	{ 50—50 51—51
12	24.5	4.0	31.8	32.6	14.0	?12.8	5.0	4.0	37.0	?6.8	.....	5.7	.....	{ ?55—?55 54—52
14	24.0	4.0	31.0	32.2	?14.2	?12.8	4.2	3.8	35.5	6.5	.....	5.8	....	{ ?55— 53—
21168	24.9	4.3	32.2	33.6	14.4	13.9	4.3	3.45	37.5	.....	23.8	6.0	0.3	{ 49—47 46—47
23302	21.7	4.0	29.0	30.1	14.3	13.0	5.05	3.8	33.5	5.0	21.7	5.9	0.3	{ 47—47 48—46

* Labeled *Clymenia alope*.

6. TURSIO Wagler.

Tursio, Wagler, Nat. Syst. Amphib., 1830, p. 34.
Leucorhamphus, Lilljeborg, Upsala Univ. Årsskrift, 1861, p. 5.

Professor Flower (*List*, p. 497) is inclined to believe that the finless dolphins on which this genus is erected may prove to belong to *Prodelphinus*. Until the skeleton is obtained it will be impossible to decide whether this view is correct or otherwise. The skull in the National Museum (No. 8160, obtained by Mr. Dall), however, which is known to be that of a finless dolphin, presents certain characters which make it probable that this genus has claims to recognition equally with *Lagenorhynchus*, *Prodelphinus*, and other genera of the family.

In the skulls in the College of Surgeons, London, and the National Museum, respectively, and in that figured in the *Ostéographie* (Pl. XXXVIII, figs. 3 and 3*a*) the pterygoids are apart at their base, and, except in the first mentioned, throughout their entire length. In an adult skull in the Berlin Museum from Yeddo, Japan, collected by Dr. Hilgendorf, the pterygoids are long and are not in contact distally. If, when more specimens have been accumulated, this character is found

to hold good, it will aid in distinguishing this genus from *Lagenorhynchus*, *Prodelphinus*, *Tursiops*, and *Delphinus*, its nearest allies.

In the skull in the National Museum the free margins of the maxillæ behind the notch are thinned out as in *Sagmatias*. I neglected to note this character in the skull in the College of Surgeons, and Van Beneden and Gervais figure only the lower side of their specimen.

The mandible of our specimen is remarkable for its extreme attenuation anteriorly. It is bent downward and is not keeled anteriorly. In Cuvier's figure of *L. peronii* the mandible is bent downward, but is distinctly keeled (*Oss. fossiles*, 4th ed., pl. 222, figs. 5–6).

The scapula of *L. peronii*, figured by Cuvier (*Oss. foss.*, 4th ed., pl. 224, fig. 20), is, as pointed out, remarkable for its width as compared with its height. The acromion and coracoid are also very large.

The genus may be provisionally defined as follows: No dorsal fin. Pterygoids apart in the median line, at least at the base. Maxillæ not thickened behind the notch.

Two species are tolerably well known, the one, *L. peronii*, from the South seas, and the other, *L. borealis*, from the North Pacific. They may be distinguished by their coloration, as follows:

1. Beak and pectoral fins white ..... *L. peronii*
2. Beak and pectoral fins dark, like the back ..... *L. borealis*

TURSIO PERONII (Lacépède).

Delphinus peronii, Lacépède, Hist. nat. des Cétacés, 1804, p. 316.
Delphinus leucorhamphus Peron (MS.), *fide* Lacépède, Hist. nat. des Cétacés, 1804, p. 316.
Leucorhamphus peronii, Lilljeborg, Upsala Univ. Årsskrift, 1861, p. 5.

Neither Lacépède nor Desmarest (Mammalogie, p. 517) seems to have suspected that Peron's *Dauphin leucorhamphe* was without dorsal fin, but Cuvier,* having obtained a skin from India through Dussumier, in which the dorsal was absent, while the colors corresponded to those of Peron's dolphin, concludes that the latter was finless. He identifies his specimen with the *D. peronii* of Lacépède.

Very few specimens of this species have been preserved. The skull figured by Van Beneden and Gervais (Ostéog. pl. 38, fig. 3) is presumably that received by Cuvier from Captain Houssard,† though these authors do not state that it is the same. I unfortunately failed to see this specimen when in Paris. Gray (Cat. Seals and Whales, p. 277) gives measurements of a skull in the same museum "from Peron," but I think that there must be some mistake regarding this statement. There is a skull (No. 3029) in the College of Surgeons, London, which Professor Flower has identified with this species. The four skulls (Nos. 17, 18, 19, 20) in the Leyden Museum, which are labeled *D. peronii*, do not

* Recherches sur les Ossemens fossiles, 4me éd., viii, pt. 2, 1836, p. 107.
† F. Cuvier has *Houssart* (Hist. nat. Cétacés, p. 165).

seem to me to belong to this species. One of them (No. 20) is apparently that mentioned by Schlegel under this species in the *Abhandlungen* (Heft 1, p. 24). It most resembles *Prodelphinus frœnatus*.

Judging from an authentic skull of *L. borealis* in the National Museum (presently to be described), I believe that there can be no reason to doubt the correctness of Professor Flower's identification of skull No. 3029 in the College of Surgeons. It is from Tasmania. The total length is 44^{cm}. The triangular area in front of the nares is but slightly concave. The intermaxillæ, which are much depressed, do not touch in the median line; they are farthest apart at the distal extremity. The central portion of the symphysis below is raised above the level of the lower surface of the rami. The coronoid is high. The pterygoids, as already stated, touch only at the tip. The palate is convex.

All these characters are presented by the skull of *L. borealis* and are, therefore, of no moment in distinguishing the two species. Indeed, I am at a loss to find cranial characters by which to distinguish them, since the proportions of the two skulls (see p. 82) are on the whole very much the same. In the skull of *L. peronii*, however, the temporal fossæ are relatively smaller, the mandible is shorter, its depth opposite the coronoid process is less, and it is less attenuated at the extremity. The right intermaxillary bone in our skull of *L. borealis* ends proximally opposite the *middle* of the nares, instead of running back to the posterior wall, but this is very probably an individual variation.

The skull figured in the *Ostéographie* is also much like that of *L. borealis* from California, but we know that the former is from south of the equator, while, so far as I am aware, no porpoise having the coloration of *L. borealis* has been observed in southern waters. It would appear, therefore, that the two species are closely alike in cranial characteristics, but widely dissimilar in coloration.

The figures of *L. peronii* given by D'Orbigny and Gervais (specimens from Cape Horn) and Gray (specimens from midway between Cape Horn and New Zealand) agree very closely, the chief difference being that in the former the pectoral fin is represented as dark in the center of the posterior margin.

Lesson's figure (Voyage of the *Coquille*, pl. 9, fig. 1) represents a dolphin with white flukes and an elongated beak, which characters are also mentioned in the text.*

This may be a distinct species, though it is more than probable that the figure is inaccurate. The measurements of the exterior given by Lesson † differ much from those which I find in the notes upon *L. bore-*

* Zoology, Voyage of the *Coquille*, 1, pt. 1, p. 180. † *L. c.*

alis which Mr. Dall has kindly placed at my disposal. In the following table are given both series of measurements, reduced to centimeters:*

Measurements.	L. peronii. From Lesson.	L. borealis. From Mr. Dall's notes. 8160 ♂. 200 miles off Cape Mendocino, Cal.
	Centimeters.	*Centimeters.*
Total length	184.1	246.4
Circumference opposite the genitals	64.9	53.3
Circumference of the head at the eyes	73.1	57.2
Length of the tail	43.3	40.6
Length from extremity of snout to pectoral	59.5	63.5
Length from angle of mouth to eye	5.4	9.5
Length from eye to pectoral	25.7	30.5
Length of the pectoral	31.1	30.5
Length from extremity of snout to corner of mouth	27.1	24.8
Length of the tail*	14.9	.....
Length of the penis	21.7	.....
Length of the eye	2.7	.....
Length from anus to extremity of tail	44.7	57.2
Length of the anus	1.8	.....

*I understand this to be the antero-posterior length of either fluke. The fourth measurement is the width between the extremities of the flukes.

It appears that Lesson's specimen was much stouter than the *L. borealis* observed by Mr. Dall, and had wider flukes and longer pectoral fins and mouth. Mr. Dall's sketch of his specimens shows these characters. It represents a dolphin more slender than even that figured by D'Orbigny and Gervais; and while, in all the figures of the southern forms the snout and pectoral fins at least are white, in Mr. Dall's figure the black color extends to all parts of the body except an area on the belly and a small space on the under side of the lower jaw.

There is a painted skin of this species (No. 6086) in the Zoological Museum of Berlin. The beak and pectoral fins are painted white, and the same color extends upon the upper anterior margin of the flukes.

That there are two distinct species of right-whale porpoises can not, I think, be doubted.

TURSIO BOREALIS (Peale).

Delphinapterus borealis, Peale, U. S. Explor. Exped., Mamm. Ornith., 1848, p. 35, Pl. VIII, fig. 2.

Leucorhamphus borealis, Dall, in Scammon's Marine Mamm., 1874, p. 296.

The general accuracy of Peale's figure of this animal is confirmed by Mr. Dall's MS. notes upon, and figure of, a second specimen (already referred to) taken 200 miles off Cape Mendocino, California, a short distance south of the locality in which it was first observed by Peale. Peale's brief description applies to Mr. Dall's figure, except that in the latter the lower jaw is represented as protruding beyond the upper and is white at the extremity. In both figures the pectorals and flukes are black and in both there is a lozenge shaped white area on the breast, drawn out posteriorly into a line which extends to the flukes. In Mr.

*For fuller measurements of *L. borealis*, see p. 81.

Dall's figure the central portion of the under side of the flukes is white. It should be remembered that the individual which Peale sketched was probably young, being only about 4 feet long. Mr. Dall's specimen was a male 8 feet 1 inch long.

Scammon also figures this species in his Marine Mammalia (Pl. XIX, fig. 3). He gives the colors as in Mr. Dall's sketch, but makes the form much more robust and the head high like that of a young *Hyperoodon*. We have no means of knowing whether this figure was made from memory or from a captured specimen of the species.

The general color of the specimens obtained by Dr. Hilgendorf, in Yeddo, Japan, was black. On the belly is a white area, which in the young individual begins on a line with the eye, but in the adult extends farther forward and ends on a bluish fork, which goes to the corner of the mouth. The anterior third of the lower jaw is whitish violet, and the margin of the lower lip is black.

The following measurements were taken by Mr. Dall. A part of them, reduced to centimeters, have already been given in comparison with Lesson's measurements of *L. peronii* on page 80.

Measurements of Tursio borealis (Peale), male, taken 200 miles off Cape Mendocino, California, October, 1868.

	Inches.
Length over all	97.0
Extremity of snout to angle of mouth	9.75
Extremity of snout to eye	13.0
Extremity of snout to blowhole	14.0
Extremity of snout to anterior edge of pectoral fin	25.0
Extremity of snout to posterior edge of pectoral fin	28.5
Angle of mouth to eye	3.75
Height of eye above line of mouth	0.75
Length of anterior edge of pectoral fin	12.0
Length of posterior edge of pectoral fin, from base to angle	3.5
Length of posterior edge of pectoral fin, from angle to tip	5.5
Width of pectoral fin at base	4.0
Width of pectoral fin from posterior angle to middle of anterior margin	3.5
Length of beak	2.5
Length of portion of lower jaw protruding beyond upper	0.5
Breadth across the flukes	16.0
Antero-posterior length of either fluke	6.0
Distance from median notch to extremity of either fluke	10.25
Distance from median notch to the ending of the superior margin or keel of the tail	2.0
Height of the caudal peduncle at insertion of flukes	3.75
Diameter (from side to side) at same point	1.5
Distance from notch of flukes to anus	22.5
Length of anus	1.0
Length of genital slit	6.0
Distance from notch of flukes to genital slit	27.5
Length of penis	15.0
Girth of head at eyes	26.5
Distance around head from eye to eye below	12.5
Distance between pectoral fins	12.0

	Inches.
Width across the mouth at the angles	9.0
Girth of body at insertion of flukes	7.0
Girth of body at anus	15.5
Girth of body at genital slit	21.0
Girth of body at a distance of 4 feet from flukes	33.0
Girth of body behind the pectoral fins	36.0
Girth of body in front of the pectoral fins	34.0

Scammon states that he has seen this species as far south as San Diego Bay, California, and as far north as Bering Sea.

The differences in color and proportions between this species and *L. peronii* are so great that we may expect to find differences in the skeletons when the latter become known. The skulls, however, as already stated, show few differences. I have already referred to the shortness of the right intermaxillary bone, and it may be that this is a character peculiar to *L. borealis*. In Cuvier's figure of *L. peronii* the proximal end of the right intermaxilla is in the normal position.

TURSIO BOREALIS AND PERONII.

Table of measurements.

Catalogue number.	Species.	Collection.	Locality.	Sex and age.	Total length.	Length of beak.	Breadth of beak— At base of maxillary notches.	Breadth of beak— At its middle.	Breadth of intermaxillary at middle of beak.	Greatest breadth between outer margins of intermaxillary proximally.
					Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*
3029	*Tursio peronii* ..	R. Col. Surg ..	Tasmania...	..	44.0	24.7	11.2	6.1	3.6	8.1
	....do	[From Cuvier, Oss. foss.]...	.....	..	42.6	24.2	11.1	6.2	.....	.....
8160	*Tursio borealis*..	U.S. Nat. Mus.	200 miles off Cape Mendocino, Cal.	♂	43.7	24	11.0	5.6	3.1	7.8
n. n.	.. do	Berlin Mus ...	Yeddo, Japan	ad.	.....	26.9	11.5	....	.....	.....

Catalogue number.	Length of tooth line.	Last tooth to base of maxillary notch.	Extremity of beak to— Anterior margin of superior nares.	Extremity of beak to— End of crest of pterygoid.	Breadth between— Orbits.	Breadth between— Hinder margins of temporal fossæ.	Temporal fossæ. Length.	Temporal fossæ. Depth.	Length of mandible.	Length of symphysis of mandible.	Length of tooth row of mandible.	Depth between angle and coronoid process.	Transverse diameter of largest tooth.	Number of teeth.
	Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*		
3029	21.3	4	31.2	30.5	.....	16	6.9	5.1	36.4	.....	21.3	6.6	...	42—43 / 41—43
	20.5	.....	.....	.....	.....	....	.....	.....	36.2	.....	.....	6.5	....	... ...
8160	20.1	5.1	29	30.8	17.6	15.8	7.1	5.3	37.5	.....	20.7	6.9	0.3	42—44 / 47—47
n. n.	.....	.....	.....	.....	17.8	....	6.3	5.25	....	.....	.....	....	....	.....

7. LAGENORHYNCHUS Gray.

=*Lagenorhynchus*, Gray, Zoology of the Erebus and Terror, 1846, p. 34.
<*Delphinus* of authors prior to 1846.
>*Electra*, Gray, Suppl. Cat. Seals and Whales, 1871, p. 76.
>*Leucopleurus*, Gray, Suppl. Cat. Seals and Whales, 1871, p. 78.
>*Lagenorhynchus*, Gray, Suppl. Cat. Seals and Whales, 1871, p. 79.

Professor Flower, in his recent admirable review of the family *Delphinidæ*, gives the following diagnosis of the genus *Lagenorhynchus*:*

Rostrum scarcely exceeding the length of the cranium; broad at the base and gradually tapering toward the apex; depressed. Pterygoid bones normal, meeting in the middle line. Teeth small, not exceeding 4^{mm} in diameter, $\frac{23}{23}$ to $\frac{33}{33}$. Vertebræ very numerous, 80 to 90. Spinous and transverse processes of the lumbar vertebræ very long and slender; bodies short. Externally, head with a short but not very distinct beak.

In the course of my studies upon the genus I have found no cause to take exception to this diagnosis, except so far as the number of teeth and vertebræ are concerned. If the opinion that the *Lagenorhynchus thicolea* of Gray belongs to this genus is correct, the maximum number of teeth must be set down as $\frac{42}{42}$, or $\frac{45}{45}$, instead of $\frac{33}{33}$. On another page I have shown that *Lagenorhynchus obliquidens*, Gill, has but 74 to 76 vertebræ.

In addition to the characters summed up by Professor Flower, I have observed that the mandibular foramina in this genus are usually more crowded together at the symphysis than in *Prodelphinus* and *Delphinus*, and are not preceded by so deep canals. The presence of an area of bright color rather high up on the side, between the dorsal fin and the flukes, likewise appears to be characteristic of the genus.

The genus is, unquestionably, very closely allied to *Prodelphinus*. The teeth are, *on the whole*, more numerous, and the vertebræ less numerous in the latter genus, but some species of *Prodelphinus* have a less number of teeth and a greater number of vertebræ than some species of *Lagenorhynchus*, and *vice versa*. The proportional length of the beak, the breadth and flatness of the intermaxillæ, appear to be the chief cranial distinguishing characters which can be brought forward at present.

The number of species which have been assigned to this genus is quite large. In the following lists are included: (1) The species which appear to me valid and as properly belonging in the genus, and their synonyms; (2) species referred to the genus by previous writers, but which I regard as belonging elsewhere; (3) nominal species.

1. Valid Species and their Synonyms.

1. *Lagenorhynchus acutus* Gray. 1828.
Syn. *Delphinus eschrichtii* Schlegel. 1841.
Delphinus leucopleurus Rasch. 1843.
Lagenorhynchus perspicillatus Cope. 1876.
Lagenorhynchus gubernator Cope. 1876.

* Proc. Zool. Soc. London, 1883, p. 511.

2. *Lagenorhynchus fitzroyi* Waterhouse. 1840.
3. *Lagenorhynchus albirostris* Gray. 1846.
4. *Lagenorhynchus electra* Gray. 1846.
   Syn. *Lagenorhynchus asia* Gray. 1846.
   Phocæna pectoralis Peale. 1848.
   Delphinus fusiformis Owen. 1866.
5. *Lagenorhynchus cruciger* d'Orbigny and Gervais. 1847.
   Syn. *Lagenorhynchus clanculus* Gray. 1849.
   Lagenorhynchus latifrons (Paris Museum).
6. *Lagenorhynchus thicolea* Gray. 1849.
   Syn. *Lagenorhynchus breviceps* of Wagner.
7. *Lagenorhynchus obliquidens* Gill. 1865.
8. *Lagenorhynchus superciliosus* Schlegel. 1841.

2. SPECIES TRANSFERRED TO THE GENUS BY PREVIOUS WRITERS, BUT WHICH I REGARD AS BELONGING ELSEWHERE.

Lagenorhynchus lateralis of Cassin. Upon *Delphinus lateralis*, Peale.
Lagenorhynchus cæruleo-albus of Gray. Upon *Delphinus cæruleo albus*, Meyen.
? *Lagenorhynchus albirostratus* of Dall. From a skull supposed to be identical with *Delphinus albirostratus*, Peale.
Lagenorhynchus de Castelnau of Van Beneden.

3. NOMINAL SPECIES, UNDESCRIBED, OR DESCRIBED ONLY FROM INDIVIDUALS SEEN AT A DISTANCE.

Delphinus cruciger Quoy and Gaimard.
Delphinus albigenus Quoy and Gaimard.
Delphinus bivittata Lesson and Garnot.

SPECIES INCORRECTLY REFERRED TO THE GENUS.

1. *Lagenorhynchus lateralis* Cassin.

Upon *Delphinus lateralis* Peale. U. S. Explor. Exped., VIII, Mamm. & Ornith., 1848, p. 35, Pl. VIII, fig. 1.

Cassin assigns this species to Gray's genus *Lagenorhynchus* without giving any reason for so doing. He states that he was unable to "find any specimen in the collection of the expedition."* I have been equally unsuccessful in finding any traces of it. The species must, therefore, be judged by Peale's figure and description.

The figure in question represents a dolphin having a long beak, such as exists in *Delphinus* and *Prodelphinus*, and which does not at all resemble the short plowshare-like beak of *Lagenorhynchus*. Again, the style of coloration is more like that which obtains in *Delphinus* or *Prodelphinus* than that of *Lagenorhynchus*. Finally, the teeth exceed the number usual in *Lagenorhynchus*, viz, $\frac{41}{41}$.

For these reasons, taken together, I should exclude the species from *Lagenorhynchus*. It will be impossible to say whether it is a *Delphinus* or *Prodelphinus*, unless more external characters distinguishing those genera are brought forward. On the whole, however, it seems to me most probable that Peale's dolphin belongs to *Prodelphinus* and is closely allied to *P. marginatus* (Duvernoy).

* Cassin, U. S. Explor. Exped., Mamm. and Ornith., 1858, p. 33.

2. *Lagenorhynchus cæruleo-albus* Gray.

Founded on *Delphinus cæruleo-albus*, Meyers.

I reject this species on account of the shape of its head and the coloration, which seem to me characteristic of *Prodelphinus*. The type skull is that of a *Prodelphinus*. (See page 62.)

3. *Lagenorhynchus albirostratus* (?) Dall.

Scammon's Marine Mammalia, 1874, Appendix, p. 293.

Mr. Dall refers to the *Delphinus albirostratus* of Peale (which he assigns to the genus *Lagenorhynchus*), a skull obtained by Captain Marston in the Pacific. He does so apparently because Captain Marston's description of the exterior of the individuals of the school from which the specimen in question was obtained seemed to him to agree with the description of Peale's *D. albirostratus*. I am inclined to believe, however, after studying the measurements of the skull, that Captain Marston's specimen should be referred to *Prodelphins doris*. Whether *D. albirostratus*, Peale, should also be referred to that species must always be more or less uncertain, because it is only known from the exterior. Whatever decision may be finally reached regarding that species, it seems to me best for the present to refer Mr. Dall's specimen to *Prodelphins* rather than to *Lagenorhynchus*.

4. *Lagenorhynchus de Castelnau* Van Beneden.

Bull. de l'Acad. R. Belgique, 2me sér., XXXVI, 1873, p. 38, fig. 2.

This name has been applied by Professor Van Beneden to a figure of a young dolphin, executed by the Comte de Castelnau. From the fact that the name was not given in Latin form it is evident that it was not intended as a formal scientific appellation, but simply as a common name, *i. e.*, Castelnau's Lagenorhynchus.

Judging from the form of the head and the coloration I am inclined to believe that the figure represents a young *Delphinus delphis*, and I shall therefore omit further reference to it.

REVIEW OF THE VALID SPECIES OF LAGENORHYNCHUS.

LAGENORHYNCHUS ACUTUS Gray.

Delphinus acutus, Gray, Spic. Zool., 1828, p. 2.
Lagenorhynchus acutus, Gray, Zool. Erebus and Terror, 1846, pl. XII.
Delphinus eschrichtii, Schlegel, Abh. Gebiete Zool., etc., 1841, p. 23.
Delphinus leucopleurus, Rasch, Nyt Mag. for Naturvidens., IV, 1843, p. 97, pls. 2, 3.
Leucopleurus arcticus, Gray, Synopsis Whales and Dolphins, 1868, p. 7.
Lagenorhynchus perspicillatus, Cope, Proc. Acad. Nat. Sci. Philadelphia, 1876, p. 136.
Lagenorhynchus gubernator, Cope, Proc. Acad. Nat. Sci. Philadelphia, 1876, p. 138, pl. IV.

It is much to be regretted that the type of Gray's *D. acutus* is lost, as Professor Flower's painstaking investigation seems to prove it to be.

The original description is far from satisfactory, and, indeed, applies equally well to several other species of the genus. Since, however, Gray expanded his description in later publications so that it is plain to what species he referred, it seems best on the whole to retain the name which has secured a footing in the literature rather than to displace it by Schlegel's *D. eschrichtii*, published many years later.

I am unable to enter into the question of the identity of Schlegel's *D. eschrichtii* and Rasch's *D. leucopleurus*, since I saw the type-skeleton of neither. Professor Flower does not state that he saw the type of the former himself, but simply that it "is still to be seen in the Leyden Museum." He is convinced, however, of the identity of the two species. If such be the truth (I do not presume to appeal from Professor Flower's decision), the statement of the number of vertebræ in Schlegel's description must be incorrect. The formula derived from his description would be as follows: C. 7; D. 15; L. 32; Ca. 37 = 91. This number corresponds more closely with that found in *L. albirostris* than with that found in *L. leucopleurus*. I shall use Gray's name, *L. acutus*, throughout this section as synonymous with *L. leucopleurus* and *L. eschrichtii*.

The *Lagenorhynchus perspicillatus* and *Lagenorhynchus gubernator* of Professor Cope I regard identical with *L. acutus*. *L. gubernator*, however, is founded on a young individual (as I have determined from an examination of the type-cast and a photograph of the individual from which the same was made), and may, therefore, be disregarded. The type-cast of *L. perspicillatus* agrees absolutely in color with Rasch's figure of *L. leucopleurus*, and the measurements also agree. The measurements of *L. perspicillatus* also agree very closely with those given by Duguid for *L. acutus*. Moreover, the measurements of the large series of skulls mentioned by Professor Cope, which is still in the Museum, agree with those of the type of *L. leucopleurus*, as will be seen by reference to the table on p. 87. I have also carefully compared one of the skeletons from Cape Cod, referred to by Professor Cope, with a skeleton of *L. acutus* from the Faröe Islands, which was lent me for study by Dr. J. S. Billings, Director of the U. S. Army Medical Museum, and can find absolutely no differences but such as are referable to individual variation. The figure accompanying Professor Cope's paper (Proc. Acad. Nat. Sci. Phila., 1876, pl. IV), though styled *Lagenorhynchus perspicillatus*, is really that of one of the casts of the young *L. gubernator*. It agrees exactly with the photograph in the Department of Mammals, and may be regarded as an excellent figure of a young *L. acutus*. The name *L. bombifrons*, alluded to by Professor Cope (l. c., p. 138), is a slip of the pen, *L. perspicillatus* being intended.

The distinctions between this species and the remaining members of the genus will be pointed out in treating of the latter.

Table of measurements.

LAGENORHYNCHUS ACUTUS.

Catalogue number.	Collection.	Type of—	Locality.	Sex and age.	Total length.	Length of beak.	Breadth of beak— At base of maxillary notches.	Breadth of beak— At its middle.	Breadth of intermaxillæ at middle of beak.	Greatest breadth between outer margins of intermaxillæ proximally.
					Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*
360*a*	Brit. Mus	.....	Greenland	...	38.8	19.8	10.2	6.6	4.1	8.1
3026	R. Col. Surg	.....	Drobäk, Norway	...	39.7	20.6	10.4	7.0	3.8	8.5
3025	do	.....	Coast of Norway	....	40.6	20.9	11.1	7.3	4.4	8.2
22256	U. S. Nat. Mus.	.....	Norway	...	38.9	19.6	10.2	6.4	3.8	8.4
14327	.. do	.....	Cape Cod	....	41.7	21.4	11.2	6.9	3.8	8.4
14264	...do	.....	... do	...	39.9	20.1	10.7	6.9	4.2	8.9
14—(?)	.. do	.....	....do	....	40.9	21.1	10.9	6.9	3.8	8.7
14281	...do	.....	....do	...	41.4	21.1	11.7	7.9	4.8	8.7
14244	....do	.....	....do	....	42.5	21.6	11.4	7.6	4.3	8.9
14260	.. do	.....	....do	...	41.4	20.8	11.4	7.3	4.1	8.4

Catalogue number.	Length of tooth-line.	Last tooth to base of maxillary notch.	Extremity of beak to— Anterior margin of superior nares.	Extremity of beak to— End of crest of pterygoid.	Breadth between— Orbits.	Breadth between— Hinder margins of temporal fossæ.	Temporal fossæ. Length.	Temporal fossæ. Depth.	Length of mandible.	Length of symphysis of mandible.	Length of tooth-row of mandible.	Depth between angle and coronoid process of.	Transverse diameter of largest tooth.	Number of teeth.
	Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*		
360*a*	17.4	3.0	25.2	26.7	19.8	17.8	7.8	4.6	.....	.....	.....	.....	.....	35—34 ?—?
3026*	18.1	3.0	27.9	26.0	20.3	17.7	7.3	4.1	33.0	4.1	18.7	6.3	....	40—37 37—38
3025	16.5	5.4	27.9	26.3	21.2	17.9	7.9	4.4	33.6	4.4	16.5	6.6	.....	—30 —31
22256	17.3	3.3	23.9	27.2	19.8	18.0	6.9	4.3	32.3	.....	.....	6.4	0.4	36—37 37—37
14327	19.1	3.3	25.9	29.3	20.3	18.8	7.9	4.3	....	.....	.....	.....	.....	36—34
14264	17.6	3.6	24.7	27.5	20.6	18.6	7.6	4.6	....	.....	.....	.....	0.4	35—36
14—(?)	19.1	3.3	25.5	27.8	21.1	18.1	7.1	4.3	.....	.....	.....	.....	.....	35—35
14281	18.6	3.6	26.0	29.0	22.4	19.6	7.9	4.1	.....	.....	.....	.....	.....	37—37
14244	18.6	3.6	26.2	29.1	21.6	18.3	8.4	4.3	.....	.....	.....	.....	.....	35—35
14260	18.6	3.0	26.7	29.3	21.6	18.0	7.6	4.6	....	.....	.....	.....	.....	37—38

* One of Rasch's types of *L. leucopleurus*.

LAGENORHYNCHUS FITZROYI (Waterhouse).

Delphinus Fitzroyi, Waterhouse, Zoology of the Voyage of the Beagle, II, Mammalia, 1839, p. 25, pl. 10.

Lagenorhynchus Fitzroyi, Flower, Proc. Zool. Soc. London, 1883, pp. 490 and 511.

Regarding this species I can say nothing except to express my concurrence in Professor Flower's opinion, namely, that it is possibly

identical with *L. clanculus*. The type-specimen consists only of the beak (with the integuments) cut off close behind the last teeth. The length of the superior tooth row is 6.8 inches; width between the last upper teeth on opposite sides, 2.4 inches; length of tooth row of mandible, 6.6 inches; symphysis, 1.5 inches; depth of ramus at last tooth, 1.3 inches; width of elevated portion of the maxillary joining the palatines, 1.4 inches; teeth, $\frac{29-29}{28-27}$.

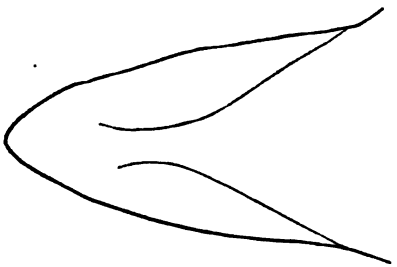

FIG. 1.

Fig. 1 represents the type specimen seen from above, reduced to a little more than two-fifths natural size.

I have carefully compared the measurements of the exterior given by Waterhouse with Duguid's measurements of *L. acutus*,* and with my own measurements of the type-cast of Professor Cope's *L. perspicillatus* but find no correspondence between them.

Compared with *L. perspicillatus* (which I regard as identical with *L. acutus*), Fitzroy's dolphin appears to have a smaller dorsal fin, situated farther from the extremity of the snout; and longer pectorals also relatively farther from the extremity of the snout. The shape of the head and the pattern of coloration seem to be very different.

This species cannot be properly studied until more specimens have been obtained.

LAGENORHYNCHUS THICOLEA Gray.

Lagenorhynchus thicolea, Gray, Proc. Zool. Soc., London, 1849, p. 2.

Electra thicolea, Gray, Synopsis, Whales and Dolphins, 1868, p. 7, pl. 36; Suppl. Cat. Seals and Whales, 1871, p. 77.

Clymenia (*Electra*) *thicolea*, Flower, Proc. Zool. Soc., London, 1883, p. 512.

? *Delphinus breviceps*, Wagner, Schreber's Säugeth., pl. 360, fig. 1; Jaquinot et Pucheran, Zool. Voyage de l'Astrolabe et Zélée, III, 1853, p. 39; Atlas, Pl. 22, fig. 1.

This species, like *L. longidens*, is one whose affinities are uncertain. Founded upon a single defective skull, reported to have been obtained on the west coast of North America, no opportunities are afforded for an estimate of the individual variation to which it is prone, or even for a very accurate determination of its cranial proportions.

Gray first placed the species in his genus *Lagenorhynchus*, and after-

* Ann. & Mag. N. H., (3), XIV, 1864, pp. 134, 135.

wards relegated it to the section *Electra*, which he raised to generic rank. Professor Flower, in his recent admirable essay, seems first in doubt as to whether it should not be assigned to *Lagenorhynchus* (P. Z. S., 1883, p. 490), but later describes it in connection with the genus *Prodelphinus*, and finally places it in his tentative list of species of that genus (P. Z. S., 1883, pp. 496 and 512) near *P. obscurus*.

The considerations which lead me to assign this species to *Lagenorhynchus* are the same which influenced me in the case of *L. longidens* (p. 99), to which in fact the present species appears to be closely related. It differs from that species in that the beak is shorter and narrower, the intermaxillaries narrower, the temporal fossæ smaller and more oval. But it differs also especially from *L. longidens*, and indeed from all other species to which it can be approximated, in having about 42 teeth in each ramus of the mandible. The teeth in the upper jaw would appear to be 45–45, but their number can only be estimated on account of the imperfect condition of the skull.

The label states that this skull was derived from the west coast of North America, and was taken out of Dr. Dickie's collection. If the record is correct, it is somewhat singular that the species was not met with by Captain Scammon or Mr. Dall. There are no specimens in the national collection which can be assigned to it.

LAGENORHYNCHUS BREVICEPS Wagner.

A skull of this species is figured by Messrs. Van Beneden and Gervais,* under the name of *Lagenorhynchus breviceps*, but the authors do not state explicitly that it is the type of Hombron and Jacquinot, figured in the atlas of the voyage of the *Astrolabe*. That the two figures are not from the same specimen appears probable from the fact that the latter represents an entire skull, while the former represents one from which the top of the brain-case has been removed. In general appearance the two figures though much alike are not identical. Professor Flower has referred Messrs. Van Beneden and Gervais's figure to *Prodelphinus*.* Hombron and Jacquinot's figure of the exterior,† however, represents a dolphin having the contours and the coloration of a *Lagenorhynchus*, and the species must, I think, be referred to that genus. Whether it should be regarded as identical with *L. thicolea* is perhaps somewhat questionable, for while the skull figured in the atlas of the *Astrolabe* expedition agrees with the type-skull of *L. thicolea* the teeth are considerably more numerous in the latter. The original specimen of *D. breviceps* was from the Rio de la Plata.

It is to be observed, however, that the naturalists of the *Astrolabe* expedition state that they found only fragments of a skull, etc., in the collection. It is possible, therefore, that the skull which is figured as

*Ostéographie des Cétacés, pl. XXXVI, fig. 2.

* Proc. Zool. Soc., London, 1883, p. 496.

† Zool. Voyage Astrolabe et Zélée, atlas, pl. 22, fig. 1.

entire in the atlas of the *Astrolabe* expedition, was afterwards broken, and that it is this same skull which was figured by Messrs. Van Beneden and Gervais.

Table of measurements.

LAGENORHYNCHUS THICOLEA.

Catalogue number.	Collection.	Type of—	Locality.	Sex and age.	Total length.	Length of beak.	Breadth of beak— At base of maxillary notches.	Breadth of beak— At its middle.	Breadth of intermaxillæ at middle of beak.	Greatest breadth between outer margins of intermaxillæ proximally.
					Cm.	Cm.	Cm.	Cm.	Cm.	Cm.
934*a*	Brit. Mus...	*L. thicolea*, Gray.	W coast North America.	.....	37.5	[1]20.0	9.7	5.3	2.8	7.8

Catalogue number.	Length of tooth-line.	Last tooth to base of maxillary notch.	Extremity of beak to— Anterior margin of superior nares.	Extremity of beak to— End of crest of pterygoid.	Breadth between— Orbits.	Breadth between— Hinder margins of temporal fossæ.	Temporal fossæ. Length.	Temporal fossæ. Depth.	Length of mandible.	Length of symphysis of mandible.	Length of tooth-row of mandible.	Depth between angle and coronoid process.	Diameter of largest tooth.	Number of teeth.
	Cm.	Cm.	Cm.	Cm.	Cm.	Cm.	Cm.	Cm.	Cm.	Cm.	Cm.	Cm.	Cm.	
934*a*	17.3	3.7	23.7	.....	16.3	.....	5.6	4.1	31.1	3.0	18.1	6.1	0.25	$\frac{(45)-(45)^2}{42-42}$

[1] One centimeter should be added for breakage. [2] An estimate.

LAGENORHYNCHUS CRUCIGER (d'Orbigny et Gervais).

Delphinus cruciger, d'Orbigny et Gervais, Voyage dans l'Amér. mérid., IV, pt. 2, 1847, p. 32; IX, Pl. XXI, fig. 1–4.

Lagenorhynchus clanculus, Gray, Proc. Zool. Soc., London, 1849, 1.

Electra clancula, Gray, Synopsis, 1868, p. 7, pl. 35; Malm, Sven. Akad. Handl., n. f., IX, I, 1870, p. 68.

? *Delphinus cruciger*, Quoy et Gaimard, Zool. Voy. Uranie et Physicienne, 1824, Pl. XII, figs. 3, 4. (*Fide* Gray.)

The skulls which I refer to this specimen are the following:

Paris Museum, No. *a*3045, labeled *L. cruciger*, d'Orbigny, 1830 (type).
Paris Museum, No. *a*3041, labeled *L. latifrons*, New Zealand.
British Museum, No. 935*a*, type of *L. clancula*, Gray.
Royal College of Surgeons, No. 3027, labeled *L. clanculus*.

If the skull in the Paris Museum, No. *a*3045, labeled "d'Orbigny, 1830," is that which d'Orbigny figured in the "Voyage dans l'Amérique

méridionale," under the name of *Delphinus cruciger* (and after close examination I find no reason to believe otherwise), there can be no doubt that this species is the same as the *L. clanculus* of Gray, described in 1849.

With these skulls must also be associated two other specimens, No. *a*3041, of the Paris Museum, labeled *L. latifrons* (a name which I have been unable to find in the literature), and No. 3027, of the Royal College of Surgeons.

In all these specimens the "triangle" is more or less elevated, and is flat and slightly or not at all rugose. The intermaxillæ are flat and nearly horizontal, and are not twisted into a vertical position at the distal extremity. The temporal fossæ are full ovals in the Paris specimens, but in the type of *L. clanculus* the anterior side is straight, so that the fossæ present the appearance of half ovals. The pterygoids are short but wide; they touch the median line. The normal dental formula is probably $\frac{28-28}{28-28}$, though the teeth in the specimens themselves present the variations in number common to all the toothed whales.

It has been the fashion, since the time of F. Cuvier at least, to seriously consider the identity of the *D. cruciger* of Quoy and Gaimard and the *D. bivittatus* of Lesson, species which were "*vus en mer et dessinés à distance.*" D'Orbigny fell into this error (though hesitatingly) in adopting Quoy and Gaimard's name for the animal which he captured and of which he sent the skull to Paris. He thereby produced confusion in the nomenclature. The misstep of the French explorers was not that they made drawings of animals which they only saw at a distance, but that they introduced them into their narrative under special scientific names. Considering that such names have no validity, I hold that d'Orbigny and Gervais's binomial is the proper one to apply to the species in question.

It is not to be denied, however, that much interest frequently attaches to such representations as have been referred to.

Malm, in his account of the specimens of Cetaceans in the Swedish Museums* describes a skeleton and skin of this species obtained by Captain Wärngre at Cape Horn.

The skull is a little smaller than that of the type of *L. cruciger*, but agrees with it perfectly in proportions (see table below). The vertebral formula is as follows: C. 7; D. 13; L. 22; Ca. 29; total 71. For a full account of this individual the reader is referred to Malm's original article.

* A. W. Malm, K. Svenska Vetens.-Akad. Handl., ny följd., IX, pt. 1, 1870, p. 63.

Table of measurements.

LAGENORHYNCHUS CRUCIGER.

Catalogue number.	Collection.	Type of—	Locality.	Sex and age.	Total length.	Length of beak.	Breadth of beak— At base of maxillary notches.	Breadth of beak— At its middle.	Breadth of intermaxillæ at middle of beak.	Greatest breadth between outer margins of intermaxillæ proximally.
					Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*
a 3045	Mus. d'Hist. nat.	*D. cruciger* d'Orb. & Gerv.	.....	....	34.9	17.8	10.7	6.6	4.1	8.7
935*a*	Brit. Mus.....	*D. clanculus*, Gray.	.....	....	34.9	17.6	10.4	6.4	3.3	7.8
a 3041	Mus. d'Hist. nat.	.....	.....	....	34.9	18.3	10.7	5.6	3.4	8.1
3027	R. Coll. Surg ..	.....	.....	....	.....	18.7	10.4	6.0	3.3	7.9
	Stockholm Mus.	(From Malm).	Cape Horn	....	33.8	17.8	10.5	.....	.....	.....

Catalogue number.	Length of tooth-line.	Last tooth to base of maxillary notch.	Extremity of beak to— Anterior margin of superior nares.	Extremity of beak to— End of crest of pterygoid.	Breadth between— Orbits.	Breadth between— Hinder margins of temporal fossæ.	Temporal fossæ. Length.	Temporal fossæ. Depth.	Length of mandible.	Length of symphysis of mandible.	Length of tooth-row of mandible.	Depth between angle and coronoid process.	Diameter of largest tooth.	Number of teeth.
	Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*		
*a*3045	15.2	3.3	22.1	22.4	17.1	16.3	6.9	4.1	28.2	3.5	.....	6.6	...	28—27 28—27
935*a*	15	3.6	21.9	22.6	17.4	16.2	6.9	3.4	29	3.3	15.8	7.1	0.23	30—30 30—29
*a*3041	15.2	4.1	22.9	23.1	17.6	16.3	7.1	4.2	28.7	3.5	.....	6.9	....	28—28 28—28
3027	16.1	3.2	.....	23.1	17.7	23.8	.....	.....	29.1	3.8	16.2	6.6	...	—29 —29
n. n.	.....	.....	.....	.....	.....	.....	.....	.....	28.6	.....	.....	.....	...	31—32 32—33

LAGENORHYNCHUS SUPERCILIOSUS Schlegel.

Delphinus superciliosus, Schlegel, Abhandl. in der Geb. Zool., Heft I, 1841, p. 22, Pls. I–II, fig. 3 (skull), fig. 4 (teeth).

Schlegel (l. c.) identifies a skeleton sent to the Leyden Museum by Van Horstok from the Cape of Good Hope with the *D. superciliosus* of Lesson and Garnot, though for what reason does not appear. I found no specimens of the latter species in the Paris Museum, and from the remarks of F. Cuvier (Nat. Hist. des Cétacés, pp. 148, 149) I am led to believe that none were brought home by Lesson and Garnot. Re-

garding the skeleton in question, Schlegel makes the following statements:

That this species (*D. superciliosus*), moreover, occurs off the Cape of Good Hope appears from the observations of our late explorer, Dr. Van Horstok, who has sent us a complete skeleton of the species.*

What the observations of Van Horstok were does not appear. They seem to have been such as to convince Schlegel that his skeleton belonged to Lesson and Garnot's *D. superciliosus*.

The following is a description of this skeleton: No. 40; Voy. Horstok; Cape of Good Hope. Vertebræ: C. 7; D. 13; L. and Ca., 53; total, 73. Lumbars twenty. Chevrons twenty. Only the atlas and axis united. Superior transverse process of the seventh cervical vertebra long; the others rudimentary. Inferior transverse process of the sixth cervical rather long; of the fifth shorter; of the other cervicals, rudimentary. Neural spines of the third to the seventh cervicals very short. Neural spine of the first dorsal pointed; the succeeding ones increase in breadth backward to the tenth or eleventh dorsal, then again decrease. Those of the lumbars subequal. Neural arch obsolete on the sixtieth vertebra. Transverse process obsolete on the fifty-fifth vertebra. First six ribs with heads; these ribs also join the sternum. Sternum of four segments; the first largest, the last rather rudimentary. Acromion long and broad, reaching to the anterior angle of the scapula; coracoid about one-half the length of the acromion, broadened at the extremity. Radius and ulna straight. Carpals five; three large ones in the distal row, two smaller ones in the proximal row. (Manus defective.)

Skull.—The skull resembles that of *P. obscurus*, but the intermaxillæ are more nearly flat. The prenarial triangle extends about an equal distance before and back of the maxillary notch, and is depressed, but flat and not rugose. The sides of the intermaxillæ bordering the nasal aperture are beveled as in *Cephalorhynchus*. The maxillæ are but little bent. A wide opening (1^{cm} at the widest point) intervenes between the premaxillæ and extends along the entire beak. Palate very flat. Pterygoids on a wide base (4.1^{cm}); they are broken, but were apparently in contact, except at the tip. The ramus of the mandible is slender toward the symphysis, which is not strongly keeled. Teeth, $\frac{30-30}{30-29}$.

Scapula, 15.5^{cm} long; 9.8^{cm} high. Highest neural arch, 8.4^{cm}. Total length of the skeleton as mounted, 153^{cm}.

The chief peculiarities of the skull of this species are the flatness of the premaxillæ and the beveling of their proximal extremities. In these respects it is very different from that of *P. obscurus*, with which it agrees well in proportions. On account of the flatness of the intermaxillæ and the crowding of the foramina at the symphysis of the mandible, I am inclined to place this species in the genus *Lagenorhynchus*. The small

* Schlegel, Abhandlungen, Heft 1, 1841, p. 22.

number of vertebræ, however, and the comparative shortness of the transverse processes, are more characteristic of *Prodelphinus*.

In addition to the type at Leyden, I observed at Louvain a skull and a beak which appeared to belong to this species. These I did not have an opportunity to examine closely. While resembling *P. obscurus*, however, in general appearance, they differ in having flat premaxillæ. In the complete skull the pterygoids appear to be separate, a character the importance of which is strongly insisted upon by Professor Flower. The beak was purchased from a dealer, and possibly came from Africa.

Table of measurements.

LAGENORHYNCHUS SUPERCILIOSUS.

Catalogue number.	Collection.	Type of—	Locality.	Sex and age.	Total length.	Length of beak.	Breadth of beak—		Breadth of intermaxillæ at middle of beak.	Greatest breadth between outer margins of intermaxillæ proximally.
							At base of maxillary notches.	At its middle.		
40	M. Pays-Bas *.	*L. superciliosus* Schlegel.	Cape of Good Hope.	....	*Cm.* 35.6	*Cm.* 19.4	*Cm.* 8.5	*Cm.* 5.4	*Cm.* 3.2	*Cm.* 6.9

Catalogue number.	Length of tooth-line.	Last tooth to base of maxillary notch.	Extremity of beak to—		Breadth between—		Temporal fossæ.		Length of mandible.	Length of symphysis of mandible.	Length of tooth-row of mandible.	Depth between angle and coronoid process.	Diameter of largest tooth.	Number of teeth.
			Anterior margin of superior nares.	End of crest of pterygoid.	Orbits.	Hinder margins of temporal fossæ.	Length.	Depth.						
	Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	
40	16.6	3.5	22.8	.....	14.0	13.0	6.8	4.5	.....	3.3	.....	6.0	0.3	30—30 29—29

* V. Horstok.

LAGENORHYNCHUS ALBIROSTRIS Gray.

Lagenorhynchus albirostris, Gray, Ann. & Mag. Nat. Hist., XVII, 1846, p. 84.

There is, fortunately, no obscurity surrounding this species. Gray correctly characterized Brightwell's specimen as the type of a new species of the genus *Lagenorhynchus*, and since that time its distinctness has not been questioned.

The most closely allied species is *L. acutus*, from which it is dis-

tinguished by its color-markings and their disposition, as well as by numerous skeletal characters.

*Brightwell's specimen, the type of the species, is in the Norwich Museum, where I had the privilege of examining and measuring it. It is not an old individual.

Table of measurements.

LAGENORHYNCHUS ALBIROSTRIS.

Catalogue number.	Collection.	Type of—	Locality.	Sex and age.	Total length.	Length of beak.	Breadth of beak— At base of maxillary notches.	Breadth of beak— At its middle.	Breadth of intermaxillæ at middle of beak.	Greatest breadth between outer margins of intermaxillæ proximally.
					Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*
555c	Cambridge Mus	.....	.....	....	44.1	21.9	14.4	8.1	5.3	.....
555*f*	...do	.....	Ramsgate ..	....	42.2	20.2	14.0	7.4	.....	.....
3028	R. Coll. Surg ...	.....	.....	...	43.0	21.2	14.6	7.9	4.4	10.4
n. n.	Norwich Mus ..	*L. albirostris*..	Yarmouth ..	Ad.	45.7	21.6	13.5*	8.4	5.1	10.9
916*c*	Brit. Mus	.....	Cromer.	...	44.5	21.9	14.6	8.4	2.0	10.7
916*b*	...do	.....	.....	...	43.9	20.3	14.0	8.0	5.5	10.9
n. n.	Mus. Sci. and Art, Edinburgh. †	.....	.....	...	46.0	22.9	15.2	8.7	5.1	10.8

Catalogue number.	Length of tooth-line.	Last tooth to base of maxillary notch.	Extremity of beak to— Anterior margin of superior nares.	Extremity of beak to— End of crest of pterygoid.	Breadth between— Orbits.	Breadth between— Hinder margins of temporal fossæ.	Temporal fossæ. Length.	Temporal fossæ. Depth.	Length of mandible.	Length of symphysis of mandible.	Length of tooth-row of mandible.	Depth between angle and coronoid process.	Number of teeth.
	Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	
555c	.....	.....	.....	.....	22.6	18.7	.....	.....	.....	.....	.....	.....	26—26 / 26—27
555*f*	.....	.....	.....	.....	21.9	18.0	.....	.....	.....	.....	.....	.....	26—24 / 27—28
3028	18.7	3.8	28.2	28.2	23.1	17.7	10.1	6.0	35.5	4.4	18.4	8.5	24— / 23—
n. n.	.....	.....	.....	.....	23.4	.....	9.5	.....	36.9	5.1	.....	.....	26— / 26—
916*c*	22.3	3.9	28.9	.....	23.1	18.9	8.3	4.8	.....	.....	.....	.....	28—27 / †—†
916*b*	18.2	4.1	27.0	28.7	23.1	19.3	9.2	6.4	35.6	4.6	18.0	8.1	26—26 / 27—25 (+†)
n. n.	.....	.....	.....	.....	23.5	18.8	7.9	6.4	.....	.....	.....	.....	.....

* Least. † Collected by Traill.

LAGENORHYNCHUS OBLIQUIDENS Gill.

Lagenorhynchus obliquidens, Gill, Proc. Acad. Nat. Sci., Phila., 1865, p. 177.
? *Delphinus longidens*, Cope, Proc. Acad. Nat. Sci., Phila., 1866, p. 295.
? *Clymenia longidens*, Dall, Scammon's Marine Mammalia, 1874, p. 288.
? *Clymenia similis*, Gray, Proc. Zool. Soc. London, 1865, p. 147.

This species is unquestionably valid, although closely related to *L. acutus*, Gray, and to *L. cruciger*, d'Orbigny. It would appear to be absolutely larger than the latter, judged by the skull, and more robust though not longer than the former. The National Museum is at present in possession of four adult skulls of Dr. Gill's species, and two entire skeletons, representing, respectively, an adult and a rather young individual. On comparing one of the adult skulls with a similar one from the large series of *L. acutus* in the Museum numerous differences become apparent. The margins of the rostrum in *L. obliquidens* converge very gradually from a point about an inch anterior to the notch to a point about the same distance from the tip. The outline of the rostrum does not suggest a triangle, therefore, as in *L. acutus*, but rather a rectangle, of which the anterior corners are rounded off. The surface of the intermaxillæ is more convex in *L. obliquidens* than in *L. acutus*, and the prenarial triangle is more elevated and extends further upon the rostrum. The orbits are much further apart in *L. acutus*, owing to the great expansion of the proximal half of the maxillæ. Viewed from the side, the skulls of the two species are strikingly different owing to the large size, quadrate form, and the posterior and superior extension of the temporal fossæ of *L. obliquidens*. The biting-power of this species must be much greater than that of *L. acutus*, not only on this account but because the teeth are larger and more deeply implanted in the alveoli. In both species the roots of the teeth are abruptly turned backward at their extremity, a character which is common in this genus.

The inferior surfaces of the skulls present many differences, but these are difficult to express on account of the complexity of the parts. The pterygoids are the least bell-shaped in *L. acutus* and extend much farther back than in *L. obliquidens*. The shape of their free margin and the extent of contact in the median line is widely different in these two skulls, but this is a character which is subject to much variation.

In proportions of parts the skulls of *acutus* and *obliquidens* show no consonance. The distance from the maxillary notch to the anterior end of the temporal fossa exceeds the width of the beak at the notch in *acutus*, but is less than the latter width in *obliquidens*. The breadth across the proximal end of the right maxilla from the lateral free margin to the superior nares equals the width of the beak at the notch in *acutus*, but the former only equals three-fourths the latter in *obliquidens*. The length of the free border of the malar only exceeds by a little more than one-half the length of the orbit in *obliquidens*, while in *acutus* the

two are very nearly equal in length. The premaxillæ scarcely form any part of the palate in *obliquidens*, but appear in nearly the whole of its distal half in *acutus*.

There are numerous other differences of proportions in the skulls which are equally striking. Taken together they form a sufficient basis for specific distinction.

The numerical relations of parts in the skeletons also offer characters for discrimination. The number of vertebræ in specimens of *L. obliquidens*, *L. acutus*, and *L. albirostris*, are as follows:

Collection.	Species.	C.	D.	L.	Ca.	Total.
U. S. N. M.	*L. obliquidens* (n. n. adult)	7	13	24	30	74
U. S. N. M.	*L. obliquidens* (14329, Juv.)	7	13	23 (or 24)	32 (or 31)	75
	L. acutus (Poelman)	7	15	19	39	80
R. C. S. E.	*L albirostris* (3028)	7	14	67		88

The last-named species clearly has many more vertebræ than *L. acutus*, while *L. obliquidens* has fewer. A critical examination of the immature skeleton of *L. obliquidens*, however, makes it necessary to allow for one or possibly two more caudal vertebræ, so that the total number in the latter species is brought nearer that in *L. acutus*, which sometimes has but seventy-nine vertebræ. The transverse processes of the twenty-first vertebra in the immature skeleton of *L. obliquidens* are long and truly lumbar in character and do not appear to have given attachment to a fourteenth pair of ribs, but such a pair would doubtless be found in some specimens of a series, and as *L. acutus* sometimes has but fourteen pairs the character will probably prove of no value in distinguishing the species. The difference in the relative number of lumbar and caudal vertebræ can not be in like manner disposed of, and would appear to constitute a real distinction between the two species.

The number of phalanges in the left manus of our skeleton of *L. obliquidens* is as follows: I, 2; II, 7; III, 5; IV, 1; V, 0. One phalange should probably be added in the case of figures III, IV, and V, as the specimen appears to be defective at these points. The numbers would then agree with those given by Gervais for *L. acutus*, viz. I, 2; II, 7; III, 6; IV, 2; V, 1.* Malm, it should be observed, gives quite a different formula, for *L. acutus*, namely, I, 2; II, 10; III, 6 (+1); IV, 3 (+ ?); V, 2.†

In *obliquidens* the transverse processes of the posterior lumbar vertebræ point forward, but in *acutus* backward.

There are two other species (known only from the skulls) with which *L. obliquidens* must be compared. These are *L. thicolea* and *L. clanculus*. The measurements given on p. 100 sufficiently indicate the differences existing between the skulls of *L. thicolea* and *L. obliquidens*. The rostrum

*Van Beneden and Gervais. Osteographie des Cetacées, pl. XXXV, fig. 33.

†Malm, Hvaldjur i Sveriges Museer, år 1869, p. 70.

in the former is relatively longer and narrower; the intermaxillaries are much narrower; the brain-case is narrower at the orbits; and the temporal fossæ are smaller. The teeth are more numerous and the skull is much lighter in all its parts. The skulls of *L. clanculus*, as already stated, appear to belong to a smaller species than *L. obliquidens*, and are much lighter. The rostrum is relatively broader than in *L. obliquidens* as is also the brain-case at the orbits, and at the posterior margin of the temporal fossæ. These fossæ, although of about the same length as those of *L. obliquidens*, are more depressed.

In the younger specimen of the species under consideration the teeth have been reset, and the number can not therefore be relied upon. In the adult skull, No. 1962, the teeth in the superior maxillary number 32 on each side; in the mandible, 29 on each side. They are conical and acute and lean strongly outward.

The color of *L. obliquidens* has been recorded both by Captain Scammon and Mr. Dall. The former describes it as follows:

> In point of color it is greenish-black on the upper surface, lightened on the sides with broad longitudinal stripes of white, gray, and dull black, which in most examples run into each other, but below it is of a pearly or snowy white. The posterior edge of the dorsal fin is tipped with dull white or gray, and sometimes the flukes are marked in the same manner.*

In another part of the same work Mr. Dall describes the color as follows:

> The animal is rather thick in proportion to its length; black above, with a strongly falcate dorsal. Below, white, to the edge of the patch passing from the lower lip below the pectorals and terminating a short distance behind the vent. A broad gray smouch on each side above the line of the black color, and interrupted about the middle of the animal on each side; the edges of the gray are ill-defined. The posterior edges of the pectorals and dorsal are also grayish.†

From these descriptions and the figures given by Scammon it would appear that the coloration of *L. obliquidens* differs somewhat from both of the well-known species *L. acutus* and *L. albirostris*, for in the last-named the white of the belly extends upon the upper lip, and in *L. acutus* the light color of sides occupies only an area rather high up and back of the dorsal fin.

Captain Scammon gives to this species a very wide range, but does not state localities. Mr. Dall, however, states that the specimens described by him were taken at Monterey, November 20, 1872. Dr. Gill's types (Nos. 1961–63) were obtained on the coast of California by Lieut. W. P. Trowbridge. The skeleton described above (No. 14329) was also obtained on the coast of California, but no particular localities are given in either instance. A defective cranium (No. 3123) is from Puget Sound.

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* Scammon, Marine Mammalia, 1874, 98.

† Dall in Scammon's Marine Mammalia, 1874, 293.

Lagenorhynchus Longidens Cope.

This species is known only from the single skull (No. 3886) briefly but accurately described by Professor Cope in 1866, under the name of *Delphinus longidens*. There is but one point in this description which I would criticise. Professor Cope writes as follows:

Delphinus longidens. Of the type of *D.* (*Tursio*) *obscurus* Gray, but with a considerably longer muzzle and much longer prenareal triangle, etc.

Measurements of the two type-skulls, according to the system which I have adopted, show that the total length and length of rostrum are absolutely the same in each, viz, total length 14.5 inches; length of rostrum, 7.9 inches.

In commenting upon his description Professor Cope justly remarks:

From the above [measurement] it will be seen that the nearest ally of this species is the *Delphinus* (*Lagenorhynchus*) *clanculus* Gray, in which the muzzle is considerably shorter and the cranium relatively longer and wider—that is, length of cranium proper equal in the latter to the length of the muzzle, and breadth at orbit a little greater than either. Its form renders a distinction between *Lagenorhynchus* and *Delphinus** improbable on present bases.†

Mr. Dall regards this latter view untenable in the light of Dr. Gray's revision of 1871, and places the species in the genus *Clymenia* (=*Prodelphinus* Gervais).

The skull upon which this species is based was received with the spoils of the United States Exploring Expedition, but the locality was unfortunately not given. The records show nothing except that the skull was packed with other objects in a box marked "B. 26—Z. (L.)" There is a second mandible in the collection (No. 4117), which bears the same marks, and undoubtedly belongs to the same species, but of this also the locality is unrecorded. After following out all the clews suggested by the original records, and the statements in both editions of the Mammalogy of the United States Exploring Expedition, I am forced to believe that it will never be possible to ascertain the history of these specimens, or to make sure that they did not form the basis of some of the species erected by Peale.

The type-skull is considerably broken, the pterygoid, malar, and tympanic bones being absent. Professor Cope states that the pterygoid bones were not in contact. After repeatedly examining this skull, I have become convinced that it is simply a small and youngish example of *L. obliquidens*. It presents no characters which can not be found in skulls of the latter species.

Clymenia Similis Gray.

The skull on which this species is founded can not be distinguished from skulls of *L. obliquidens*. It is nearly of the same size as the largest of our skulls of the latter species. The pterygoid bones are divergent posteriorly and the palatine table is constricted.

*Prodelphinus, as now understood.—F. W. T. † Cope, l. c., p. 296.

The skull also agrees in many points with *L. obscurus*, as Professor Flower has stated, and it is not at all impossible that the skulls now distributed among the three species, *obscurus*, *obliquidens*, and *similis*, represent only the individual variations of a single species.

Table of measurements

LAGENORHYNCHUS OBLIQUIDENS.

Catalogue number.	Collection.	Type of—	Locality.	Sex and age.	Total length.	Length of beak.	Breadth of beak— At base of maxillary notches.	Breadth of beak— At its middle.	Breadth of intermaxillary at middle of beak.	Greatest breadth between outer margins of intermaxillary proximally.
					Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*
14329	U.S. Nat. Mus.	.....	.....	Jr	39.4	19.7	10.2	7.1	4.6	8.4
1962	....do	.....	.....	....	41.9	20.7	11.2	7.9	4.6	9.4
3886	....do	*D. longidens*	.....	..	36.8	20.1	9.1	5.8	3.4	7.9
1509*b*	Brit. Mus	*O. similis*	.....	....	38.1	20.8	*10.3	6.1	3.4	7.6

Catalogue number.	Length of tooth-line.	Last tooth to base of maxillary notch.	Extremity of break to— Anterior margin of superior nare.	Extremity of break to— End of crest of pterygoid.	Breadth between— Orbits.	Breadth between— Hinder margins of temporal fossæ.	Temporal fossæ. Length.	Temporal fossæ. Depth.	Length of mandible.	Length of symphysis of mandible.	Length of tooth-row of mandible.	Depth between angle and coronoid process.	Transverse diameter of teeth.	Number of teeth.
	Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm*	
14329	16.5	3.5	24.7	26.2	17.8?	15.3?	8.9	7.1	31.3	.....	.....	6.9	....	—27 28—28
1962	18.4	3.3	25.7	27.5	18.6	17.4	8.3	6.5	.....	.....	.....	.....	.5	32—32 29—29
3886	17.5	3.6	24.5	.....	16.0	13.2	6.8	5.0	31.2	3.8	17.2	6.3	....	31—31 29—29
1509*b*	17.4	.....	24.9	.....	16.3	14.4	7.4	5.3	.....	.....	.....	.....	.5	29—29 † †

*Greatest.

LAGENORHYNCHUS ELECTRA Gray.

Lagenorhynchus electra, Gray, Zool. Erebus and Terror, 1846, p. 35, pl. 13.

Lagenorhynchus asia, Gray, Zool. Erebus and Terror, 1846, p. 35, pl. 14.

Electra obtusa, Gray, Synopsis, 1868, p. 7.

Delphinus (*Lagenorhynchus*) *fusiformis*, Owen, Trans. Zool. Soc., London, VI, 1866, p. 22, pls. V, fig. 1 (animal); VII, figs. 1–5 (skull).

Phocæna pectoralis, Peale, Mamm. and Ornith. U. S. Explor. Exped., 1st ed., 1848, p. 32; Atlas, pl. VI, fig. 1 (animal).

Delphinus pectoralis, Cassin, Mamm. and Ornith. U. S. Explor. Exped., 2d ed., 1858, p. 28, pl. V, fig. 2 (animal).

In the European collections which I examined I found seven skulls which, in my estimation, should be accredited to this species. These are as follows:

British Museum:
No. 358*a*. Type of the species.
No. 358*a*. Type of *L. asia* Gray.
No. 1475*a*. Type of *L. fusiformis* Owen.
Paris Museum:
No. *a*3044. Labeled *L. asia*.
No. *a*3082. Labeled *L. asia*.
Cambridge University Museum:
No. 555*a*. Labeled *L. electra*.
Royal College of Surgeons of England:
New No. 3024. Labeled *L. electra*.

To these should be added a mandible in the—

U. S. National Museum:
No. 4108. Type of *Phocæna pectoralis* Peale.

The differences between the types of *L. electra* and *L. asia* are very slight, and are only such as might result from a difference in age. Even Dr. Gray, who was notoriously prone to exaggerate the importance of slight differences, regarded the latter species as possibly a variety of the former.* He pointed out clearly the differences of the two skulls in the following words:

> The skull, which is without teeth, very much resembles, in the depressed and expanded form of the brain-cavity and shape of the beak, the skull of *L. electra*, but it differs from that in the beak being rather more acute in front and more contracted in the middle of the sides, and in being rather smaller in size.†

So far as the width of the beak at the middle is concerned, it will be seen from the measurements that the type of *L. asia* is intermediate between the type of *L. electra* and the skull in the Royal College of Surgeons, which is also identified with the latter species.

Furthermore, laying aside the identifications with which the different specimens are ticketed, they can not be divided into two groups according to the width or the narrowness of the rostrum, but form a continuous series, the specimen in the College of Surgeons having the narrowest rostrum and that at Cambridge the widest. The single distinction given by Gray can not, therefore, have any value, and I was unable to discover any other valid characters.

The principal difference between the skulls of *L. fusiformis* and *L. electra* noted by Professor Owen in his original description of the former species is in the width of the rostrum at the maxillary notch. This character, as I have already stated above, I do not regard as sufficiently pronounced to have any weight.

The description, and especially the figure of *L. fusiformis*, becomes interesting, however, in connection with my discovery of the real affinity of Peale's *Phocæna pectoralis*. This species, which has been bandied

* Gray, Catalogue, 1866, p. 269. † Gray, l. c.

about for some time between the genera *Phocæna* and *Delphinus*, must, if my determination is correct, be placed in the genus *Lagenorhynchus*. The type-mandible from Hawaii agrees perfectly with that of the specimen of *L. electra* in the Paris Museum, which is, fortunately, from the same locality. It agrees also with the type (Brit. Mus., No. 358*a*) of that species. It may seem unwise to attempt to determine a species of *Lagenorhynchus* from the jaw alone, and in most cases I believe that it would be so. But the mandible of *L. electra* is so peculiar in its stout form and rounded coronoid region that it is at once distinguishable.

A difficulty now arises, however, because there is a decided lack of agreement between Peale's figures of *P. pectoralis* and Owen's figures of *L. fusiformis*, which, if my conclusions are correct, represent the same species. It should be remembered, however, that Owen described the external appearance of his species from drawings of an Indian artist,* while Peale had the specimen which he figured before him in the flesh. The animal figured by Professor Owen is represented as having a distinct, elongated beak, a character which arouses my suspicion of the accuracy of the drawing, for the reason that it is at variance with the shape of the head of all other species of *Lagenorhynchus* of which the external appearance is known.

The external measurements agree fairly together, but count for little, since those of *L. fusiformis* were apparently taken from the drawing.†

The descriptions of color agree but little, though the discrepancy may perhaps be due to the fact that the Indian specimen may not have been entirely fresh. The descriptions are as follows:

Phocæna pectoralis.

Color, blue-black; a white spot on each side of the breast in front of the pectoral fins; a frontal band of light slate-color extends a short distance behind the eyes; vent and abdomen light reddish-white; lips margined with reddish-white. (Peale, U. S. Explor. Exped. Mamm. & Ormith., 1848, p. 32.)

Lagenorhynchus fusiformis.

The color of the spindle-shaped Dolphin is less darkly plumbeous than in the Gadamu, and becomes more gradually lighter towards the belly; the dorsal fin, the fore part of the pectoral and caudal fins, and the snout have the darkest pigment; the light ashy-gray belly shows no spots. (Owen, T. Z. S. VI, p. 23.)

We have, therefore, two specimens whose bones (so far as we know them) are alike, but whose external appearance is represented as widely different. As there are, so far as I am aware, no casts or mounted skins of *L. electra* in any museum we must pend judgment until more material has been collected. I believe, however, that the figure of *P. pectoralis* will be found to be essentially correct.

The reference to *L. electra* in the "Ostéographie des Cétacés" (p. 597) is very much confused. Three distinct specimens are referred to as figured in pl. XXXVI (fig. 6). The figure seems to be taken from No.

* Trans. Zool. Soc., London, VI, 1869, p. 17, pl. V, fig. 1.

† In the legend accompanying the plates of Professor Owen's Memoir (l. c., p. 46), he figure of *L. fusiformis* is said to be "diminished to scale." This scale is *not* that given on pl. V, but is apparently 7¼ in.=6 feet.

*a*3044, obtained by M. Ballieu in Hawaii. "Notre second exemplaire" is probably No. *a*3082, but the label does not state from whence it was derived. Is it the specimen "dont la présence a été constatée aux îles Bissagos, situées dans le golfe de Guinée?" This is a matter of some importance since all other specimens, of which the record is known, are from the Indian and tropical Pacific Oceans.

Table of measurements.

LAGENORHYNCHUS ELECTRA.

Catalogue number.	Collection.	Type of—	Locality.	Sex and age.	Total length.	Length of beak.	Breadth of beak— At base of maxillary notches.	Breadth of beak— At its middle.	Breadth of intermaxillæ at middle of beak.	Greatest breadth between outer margins of intermaxillæ proximally.
					Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*
358*a*	Brit. Mus.....	*L. asia*, Gray.....	.....	....	42.5	23.0	12.6	8.0	5.35	9.1
359*a*	....do	*L. electra*, Gray	.....	...	45.7	24.35	13.95	9.2	6.1	9.7
1475*a*	...do	*D. fusiformis* Owen	India ..	♀	44.5	24.4	13.7	9.1	5.5	9.2
*a*3044	Mus. d'Hist. nat..	.....	Hawaii.	....	45.8	24.9	*13.2	8.7	5.6	8.2
*a*3082	....do	.....	.....	....	45.8	24.9	*13.5	9.4	6.1	10.4
555*a*	Cambridge Mus..	.....	.....	....	44.8	24.0	15.6	10.3	5.8	10.2
3024	R. Col. Surg... ..	.....	.....	....	47.2	25.7	13.0	8.2	5.7	9.6
4108	U. S. Nat. Mus ...	*D. pectoralis* Peale.	Hawaii.	...	.....	.....	.....	.....	.....	.....

Catalogue number	Length of tooth-line.	Last tooth to base of maxillary notches.	Extremity of beak to— Anterior margin of superior nares.	Extremity of beak to— End of crest of pterygoid.	Breadth between— Orbits.	Breadth between— Hinder margins of temporal fossæ.	Temporal fossæ. Length.	Temporal fossæ. Depth.	Length of mandible.	Length of symphysis of mandible.	Length of tooth-row of mandible.	Depth between angle and coronoid process.	Diameter of largest tooth.	Number of teeth.
	Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*		
358*a*	17.0	6.9	28.65	29.2	22.6	15.75	7.5	6.35	34.65	3.8	16.4	8.15	0.46	$\frac{23(+3)-23(+3)}{23-23}$
359*a*	18.1	7.9	31.3	.....	25.2	16.3	9.4	5.5	37.1	4.3	16.8	6.1	0.41	$\frac{25-25}{23-24}$
1475*a*	16.6	9.2	30.7	31.5	24.2	15 8	8.5	5.6	36.2	3.6	.....	8.5	0.41	$\frac{22-22}{(23-)(-23)}$
*a*3044	17.6	8.2	30.5	31.9	23.6	17.5	8.1	5.6	37.4	4.1	.....	.....	....	$\frac{22-22}{24-22}$
*a*3082	18.0	7.9	30.5+	32.5	24.9	18.0	9.9	6.6	.....	.....	.....	.....	....	$\frac{.....}{.....}$
555*a*	17.5	.....	29.6	30.1	26.0	18.4	9.6	5.8	.....	3.2	.....	.....	....	$\frac{21-22}{19-19}$
3024	17.7	9.5	.....	31.7	24.4	17.1	9.2	5.4	38.4	3.6	17.0	9.2	....	$\frac{23-22}{23-24}$
4108	.....	.....	.....	.....	.....	.....	....	.....	35.6	3.8	16.3	9.1	...	$\frac{23\,?\,23\,??}{23-23}$

* Least. † From Peale.

LAGENORHYNCHUS OBSCURUS (Gray).

Delphinus obscurus, Gray, Spic. Zool., 1828, p. 2; Zool. Ere. & Terr., 1846, p. 37, pl. 16; Catalogue of Cetacea, 1st ed., 1850, p. 107.
Tursio obscurus, Gray, Catalogue, 2d ed., 1866, pp. 264 and 400.
Clymenia obscura, Gray, Proc. Zool. Soc., London, 1866, p. 215; ditto, 1868, p. 147, fig. 1 (pterygoid bones); synopsis, 1868, p. 6, pl. 16; supplement, 1871, p. 71, fig. 3 (pterygoid bones); Flower, Proc. Zool. Soc., London, 1883, p. 512.
? *Phocæna australis*, Peale, U. S. Explor. Exped., 1st ed., 1848, p. 33, pl. 6, fig. 2.

This species was originally described by Gray from a stuffed skin, but he afterwards included in the species a number of skulls in the British Museum. That the latter were properly referred to the species appears to have been confirmed by Professor Flower upon removing the skull from the type-skin in 1884. (See his *List*, p. 28.)

It has been customary among authors since 1868 to refer this species to *Clymenia* (=*Prodelphinus*). In the *Catalogue*, however, Gray, although referring the species to *Tursio*, makes the remark that "the skull of this species is intermediate between the *Lagenorhynchus* and *Delphinus*" (Catalogue Seals and Whales, p. 265). After going over the data many times it seems to me that it should properly be referred to the former genus. There is nothing in the characters of the skull that would militate against this view, and certain considerations regarding the exterior seem to confirm it.

First, the form of the head in the type specimen is unlike that of any species of *Prodelphinus* of which the exterior is known. There is no real beak, but on the contrary the head slopes gradually from the blowhole to the extremity, as in *Lagenorhynchus acutus*.

Again, the color seems rather that of a *Lagenorhynchus* than of a *Prodelphinus*. Gray's original description contains the following data regarding the color of the body:

Collo ventreque albidis, fascea nigra ab angulo oris usque ad primas pectorales; striga obliqua laterali, alba postica; cæterum totus niger.

In a young specimen in the same collection the colors are more defined; but even in the older specimens the lateral streaks are to be seen in certain positions—a fact which is not shown in the drawing. (Spic. Zool., p. 2.)

The figure of the young individual is not unlike Waterhouse's figure of *L. Fitzroyi* (Zool. Beagle, pl. 10), which species, indeed, Gray made synonymous with *obscura*. Though somewhat generalized, the figure in question, as also that of the older individual on the same plate of the *Spicilegia* (Pl. II, fig. 3), is certainly unlike any *Prodelphinus* we know.

The dimensions of the adult type-skin are as follows (measured in straight lines): Total length, 65 inches; tip of snout to corner of mouth, 8.7 inches; to eye, 10 inches; to blowhole, 9.5 inches; to anterior base of pectoral fin, 16.5 inches; to anterior base of dorsal fin (following the curves), 31.75 inches; length of the dorsal fin, 9 inches; vertical height of dorsal fin, 7.5 inches; length of pectoral fin, 11 inches; greatest breadth of pectoral fin, 3.5 inches; breadth of caudal fins, 15.75 inches.

Table of measurements.

LAGENORHYNCHUS OBSCURUS.

Catalogue number.	Collection.	Type of—	Locality.	Sex and age.	Total length.	Length of beak.	Breadth of beak— At base of maxillary notches.	Breadth of beak— At its middle.	Breadth of intermaxillæ at middle of beak.	Greatest breadth between outer margins of intermaxillæ proximally.
					Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*
354*a*	Brit. Mus.	.....	.....	....	36.8	20.1	9.3	6.1	3.3	7.8
4117	U. S. Nat. Mus.	.....	.....	....	.....	.....	.....	.....	.....	.....
354*d*	Brit. Mus.	.....	.....	....	35.5	19.3	8.7	5.5	3.0	7.1
81,10,28,1	...do	.....	Coquimbo, Chili	..	40.6	32.9	10.1	6.5	3.7	8.0
576*m*	Cambridge Mus.	.....	.....	....	38.2	21.4	9.0	6.0	.....	.....
3030	R. Coll. Surg.	.....	.....	....	36.1	20.3	*8.9	5.7	3.2	7.6
3031	....do	.....	.....	....	36.1	19.7	*8.4	5.8	2.8	7.6

Catalogue number.	Length of tooth-line.	Last tooth to base of maxillary notches.	Extremity of beak to— Anterior margin of superior nares.	Extremity of beak to— End of crest of pterygoid.	Breadth between— Orbits.	Breadth between— Hinder margins of temporal fossæ.	Temporal fossæ. Length.	Temporal fossæ. Depth.	Length of mandible.	Length of symphysis of mandible.	Length of tooth-row of mandible.	Depth between angle and coronoid process.	Diameter of largest tooth.	Number of teeth.
	Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*		
354*a*	17.3	3.8	24.1	25.3	15.5	14.2	6.7	4.8	29.9	3.7	16.7	6.2	0.25	$\frac{32-34}{30-30}$
4117	.....	.....	.....	.....	.....	.....	.....	.....	29.9	3.6	16.9	5.8	....	$\frac{\text{———}}{30-30}$
354*d*	16.3	3.4	22.6	.....	14.1	13.5	5.9	3.8	29.4	2.8	16.2	6.2	0.32	$\frac{32-31}{30-29}$
81,10,28,1	18.8	3.8	27.6	.....	16.7	14.1	7.6	5.1	33.0	.....	17.3	.....	0.30	$\frac{31-32}{?-26}$
576*m*	.....	.....	.....	.....	15.8	.....	.....	.....	.....	.....	.....	.....	....	$\frac{32}{33}$
3030	17.1	3.2	24.6	24.1	15.2	13.6	6.3	4.4	29.8	3.8	17.4	5.7	....	$\frac{32-33}{32-31}$
3031	16.5	3.8	24.7	23.8	15.5	13.3	7.3	4.7	29.2	3.2	16.3	6.3	....	$\frac{33-32}{30-28}$

*Least.

8. SAGMATIAS.

Sagmatias, Cope, Proc. Acad. Nat. Sci. Philadelphia, 1866, p. 294.

This genus must be considered valid unless the characters given by Professor Cope can be proven to be the result of age or individual variation. These characters are the elevation of the premaxillæ immediately in front of the superior nares and the thinning out of the lateral free margin of the expanded portion of the maxillæ. Except in these two characters the genus shows a close approximation to *Lagenorhynchus*, with which I was at first inclined to unite it.

The genus is based upon the single skull described by Professor Cope under the name of *S. amblodon*. It belonged to an aged individual, as appears from the coalescence of the cranial elements and the bluntness of the teeth. Nothing is known of its history, except that it was captured at sea by the ship *Vincennes*, of the United States Exploring Expedition.

In size and proportion the skull resembles that of *Lagenorhynchus superciliosus*. The beak is more sharply pointed than is usual in that genus.

SAGMATIAS AMBLODON Cope.

Sagmatias amblodon, Cope, Proc. Acad. Nat. Sci. Philadelphia, 1866, p. 294.

Table of measurements.

SAGMATIAS AMBLODON.

Catalogue number.	Collection.	Type of—	Locality.	Sex and age.	Total length.	Length of beak.	Breadth of beak— At base of maxillary notches.	Breadth of beak— At its middle.	Breadth of intermaxillæ at middle of beak.	Greatest breadth between outer margins of intermaxillæ proximally.
					Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*
3887	U. S. Nat. Mus.	*S. amblodon**	.....	....	37.2	18.5	9.7	6.2	3.4	7.3

Catalogue number.	Length of tooth-line.	Last tooth to base of maxillary notch.	Extremity of beak to— Anterior margin of superior nares.	Extremity of beak to— End of crest of pterygoid.	Breadth between— Orbits.	Breadth between— Hinder margins of temporal fossæ.	Temporal fossæ. Length.	Temporal fossæ. Depth.	Length of mandible.	Length of symphysis of mandible.	Length of tooth-row of mandible.	Depth between angle and coronoid process.	Transverse diameter of teeth.	Number of teeth.
	Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm*	*Cm.*	
3887	15.7	4.0	22.3	25.1	16.7	16.4	7.9	6.1	30.1	3.4	14.3	6.9	.....	$\frac{32-32}{31-32}$

*Caught at sea. United States Exploring Expedition.

9. FERESA Gray.

Feresa, Gray, Suppl. Cat. Seals and Whales, 1871, p. 78.
Feresia, Flower, Proc. Zool. Soc. London, 1883, p. 510.

The future development of our knowledge of this genus will be watched with much interest by cetologists. At present there is nothing to add to Gray's original description, and no additional specimens have been discovered.

I concur in Gray's opinion that the two typical skulls are clearly allied to *Lagenorhynchus electra*, and it may be found necessary eventually to include *Feresa* in that genus.

FERESA INTERMEDIA Gray.

Delphinus intermedius, Gray, Ann. Phil., 1827, p. 396.
Grampus intermedius, Gray, List of Mammalia, 1843, p. 106.
Orca intermedia, Gray, Zool. Ere. & Terr., 1846, p. 34, pl. 8; Catalogue of Cetacea, 1st ed., 1850, p. 96; 2d ed., 1866, p. 283.
Feresa intermedia, Gray, Suppl. Cat. Seals and Whales, 1871, p. 78.
Feresia attenuata, Gray, Journal du Muséum Godeffroy, Heft VIII, 1875.

I append measurements of the two typical skulls described by Gray, and which Professor Flower very properly brings together under the same specific name.

Table of measurements.

FERESA INTERMEDIA.

Catalogue number.	Collection.	Type of—	Locality.	Sex and age.	Total length.	Length of beak.	Breadth of beak— At base of maxillary notches.	Breadth of beak— At its middle.	Breadth of intermaxillæ at middle of beak.	Greatest breadth between outer margins of intermaxillæ proximally.
					Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*
362*a*	Brit. Mus ...	*Orca intermedia*	.....	....	36.2	17.3	12.0	8.9	6.1	9.1
1672*a*	....do	*F. attenuata*	South seas....	....	35.0	16.8	10.7	7.5	5.2	9.1

Catalogue number.	Length of tooth-line.	Last tooth to base of maxillary notch.	Extremity of beak to— Anterior margin of superior nares.	Extremity of beak to— End of crest of pterygoid.	Breadth between— Orbits.	Breadth between— Hinder margins of temporal fossæ.	Temporal fossæ. Length.	Temporal fossæ. Depth.	Length of mandible.	Length of symphysis of mandible.	Length of tooth-row of mandible.	Depth between angle and coronoid process.	Diameter of largest tooth.	Number of teeth.
	Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*		
362*a*	12.9	5.1	22.6	.....	21.1	15.3	9.2	7.3	28.9	3.0	13.5	7.9	.....	11—11 / 10—11
1672*a*	12.7	5.5	22.1	22.9	20.1	17.3	8.4	7.4	28.0	3.4	13.6	7.3	0.56	12—11 / 13—12

10. CEPHALORHYNCHUS Gray.

Cephalorhynchus, Gray, Cat. Cetacea, Brit. Mus., 1850, p. 106.
? Cephalorhynques, F. Cuvier, Hist. Nat. des Cetacées, 1836, p. 156.
Eutropia, Gray, P. Z. S., London, 1862, p. 145.
Eutropia, Gray, Synopsis of Whales and Dolphins, 1868, p. 7.

Although Gray credits the name *Cephalorhynchus* to F. Cuvier, it was the former naturalist who first made a formal separation of the species. Cuvier states, at the place cited:

Nous les *aurions* séparées des dauphins proprement dits sous le nom de céphalorhynques, *si* ces différences extérieures [previously pointed out] *eussent* entraîné des différences intérieures plus marquées. Un examen de ces espèces plus approfondi que celui que nous en avons pu faire déterminera peut-être plus tard cette séparation.*

This aoristical genus includes representatives of four genera, the first mentioned being *D. rostratus*, a species now referred to the genus *Steno* If *Cephalorhynchus* were to be accepted upon the authority of Cuvier, it would have to be applied, under the rules, to the species included in *Steno*.

Gray's distinctions are quite vague, and he has included *D. obscurus* in his subgenus, which is now referred to *Lagenorhynchus*. His first-mentioned species, however, is *D. Heavisidei*. Furthermore, his definition of *Cephalorhynchus* is, as already stated, a formal one, and the name itself is Latinized.

Professor Flower has left but little to be said regarding this genus and the species included under it. More facts must be forthcoming before the species can be placed upon a satisfactory basis.

The principal cranial characters of the genus seem to me to lie in (1) the separation of the pterygoids, (2) the great height of the nasal region, and (3) the expansion of the beak at the middle of its length. The expansion of the beak causes the rami of the mandible to bow out. As they are also bent downward toward the symplysis, the shape of the jaw is quite peculiar and characteristic.

CEPHALORHYNCHUS HEAVISIDEI Gray.

Delphinus (*Grampus*) *Hearisidei*, Gray, Spic. Zool., 1828, p. 2, pl. II, fig. 6.
Delphinus (*Cephalorhynchus*) *Hearisidei*, Gray, Cat. Cetacea Brit. Mus., 1850, p. 107.
Delphinus capensis, F. Cuvier, Hist. Nat. des Mammifères, liv. 58, 1829.
Delphinus cephalorhynchus, F. Cuvier, Hist. Nat. der Cetacées, 1836, p. 158.
D. hastatus, F. Cuvier, Hist. Nat. des Cetacées, 1836, p. 161.
Orca capensis, Van Beneden (*nec* Gray), Bull. Acad. R. Belg., 2d ser., XXXVI, 1873, p. 32, 1 fig.

Professor Flower has summed up the facts relative to this species in such a manner as to leave little for me to add. I append measurements

* This is a good example of what may be called gratuitous nomenclature. The author does not erect a name upon differences which he has discovered, but suggests hat in case valid distinctions are found in the future such and such an appellation ould be appropriate. Similar examples are frequent in zoological literature.

of the skulls which I examined in the Oxford, Paris, and Leyden Museums, and also of the type skin of the species which is in the British Museum. The dimensions of this latter specimen are as follows:

Measurements of a mounted skin of Cephalorhynchus heavisidei (type), from the Cape of Good Hope.

	Meters.
Total length	1.092
Extremity of beak to corner of mouth	0.155
Extremity of beak to eye	0.157
Extremity of beak to blowhole	0.158
Extremity of beak to anterior base of pectoral	0.267
Extremity of beak to anterior base of dorsal	0.516
Length of base of dorsal	0.178
Vertical height of dorsal	0.082
Length of pectoral from the anterior base	0.145
Breadth of flukes	0.247
Greatest width of pectoral	0.056

The beak is not sharply defined. The teeth are small and round. At 5.1^{cm} from the extremity of the mandible the distance between the teeth of opposite sides is 4.6^{cm}.

A cast of the head of this specimen was recently received by the National Museum through the liberality of Professor Flower.

Another stuffed skin is in the museum of Leyden. The form is very similar to that of *Phocæna*. The dorsal, however, is more sharply triangular. The forehead is somewhat concave (this may be due to drying). The color is black throughout, except a rather broad band of white, which starts about 8^{cm} posterior to the dorsal fin and somewhat below the middle of the side and runs obliquely downward, becoming merged in a second white area which occupies the center of the belly. Another similar but smaller band appears below and behind the first and is also confluent with the white of the belly. This specimen is presumably one of the "mehrere vollständige Häute" mentioned by Schlegel in the *Abhandlungen* (p. 31) as received from the Cape of Good Hope.

In one of the young skeletons at Leyden I find the vertebræ two more than the number given by Professor Flower. The formula, according to my notes, is as follows: C. 7, D. 13, L. and Ca. 47 = 67. This skeleton, as mounted, is 125^{cm} in length. The atlas and axis only are united. The seventh cervical vertebra has a superior transverse process like the transverse process of a dorsal. A superior transverse process is present also in the sixth cervical, but it is not so large. The transverse processes become obsolete at the forty-seventh vertebra, the neural arches at the fiftieth vertebra. The lumbar neural spines are sickle-shaped. The scapula is high, with a short, broad, and incurved acromion; the coracoid about equals the acromion in length and is broadened distally. The scapula is 8.9^{cm} high, 11.2^{cm} long. The first six

pairs of ribs possess heads. The skull of this specimen shows that the animal was quite young; the boundaries of the occipital elements are plainly discernible.

The skull "*b*" is also young and shows the outlines of the occipital element. The intermaxillæ are very thick and high proximally and remind me of those of *Sagmatias amblodon*. The hinder margins of the temporal fossæ are but faintly marked out in this and the preceding skull.

The skeleton No. 1670*a*, at Oxford, is also young. The palate is very flat, the rami of the mandible are strongly bent outward, and the symphysis is very short. I counted the following vertebræ: C. 7, D. 13, L. and Ca. 45 = 65. The first six pairs of ribs are furnished with heads and five pairs join the sternum. The scapula is 9^{cm} high, 11.9^{cm} long. The humerus and radius together measures 9.7^{cm}. The sternum is 11.7^{cm} long and 6.3^{cm} wide in front. The atlas 11.9^{cm} wide, 7.6^{cm} deep. The carpels are five. The neural spines are narrow antero-posteriorly and bend slightly forward in the lumbar region, in this respect somewhat resembling those of *Lagenorhynchus*. Only the atlas and axis are united.

Table of measurements.

CEPHALORHYNCHUS HEAVISIDEI.

Catalogue number.	Collection.	Locality.	Sex and age.	Total length.	Length of beak.	Breadth of beak—		Breadth of intermaxillæ at middle of beak.	Greatest breadth between outer margins of intermaxillæ proximally.
						At base of maxillary notches.	At its middle.		
				Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*
X.	Mus. Pays-Bas.*	Cape G. Hope	....	30.0	13.9	†7.2	5.2	3.1	5.2
B.	....do		....	30.0	13.7	†7.3	5.2	2.9	5.5
1670*a*	Oxford Mus		Jr	30.5	14.5	6.7	4.6	2.8	.....
3062*a*	Mus. d'Hist. nat.‡		....	29.7	14.7	7.1	5.1	2.5	5.1
3063*a*	....do	Cape G. Hope	..	28.7	13.2	6.9	4.8	2.8	5.3
3061*a*	....do		....	29.2	14.0	7.1	5.1	2.8	5.1
3061*a*	....do	Seas of N. Zealand	....	27.5	13.5	6.3	4.6	2.0	4.8

* From V. Horstok. † Least. ‡ From the N. Zealand Inst.

Table of measurements—Continued.

Catalogue number.	Length of tooth-line.	Last tooth to base of maxillary notch.	Extremity of beak to—		Breadth between—		Temporal fossæ.		Length of mandible.	Length of symphysis of mandible.	Length of tooth-row of mandible.	Depth between angle and coronoid process.		Number of teeth.
			Anterior margin of superior nares.	End of crest of pterygoid.	Orbits.	Hinder margins of temporal fossæ.	Length.	Depth.						
	Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*		
X.	12.1?	2.6	17.1	18.5	13.1	14.6	6.7	4.6	.....	.....	.....	.....	....	.....
B.	12.2	2.8	16.8	.....	12.8	14.6	7.0	5.0	.....	2.2	.....	.....	....	24–26 27–26
1670*a*	12.7	2.4	17.0	.....	12.6	13.9	6.3	4.8	23.4	2.3	.....	5.3	....	26–26 26–26
3062*a*	13.0	2.5	17.3	18.6	13.0	13.7	6.3	5.3	23.1	2.5	.....	5.1	....	29–28 29–29
3063*a*	11.4	2.3	15.8	.....	12.2	13.7	6.1	4.3	22.9	2.5	....	5.3	....	26–26 26–25
3061*a*	12.7	2.3	16.5	.....	13.0	12.7	6.6	4.8	22.1	1.8	.....	5.6	....	.....
3064*a*	11.9	2.0	16.0	17.3	12.2	12.7?	.....	.....	21.1	2.3	.....	4.8	....	28–28 –26

CEPHALORHYNCHUS ALBIFRONS True.

Electra clancula Hector, Trans., New Zealand Inst., v, 1873, p. 160–162, pls. 1 and 3 (skull and exterior); Hutton, Trans. New Zealand Inst., ix, 1877, p. 350.

It is evident from the figures given by Hector that this species is not allied to the section of the genus *Lagenorhynchus* which Gray called *Electra*, but rather to the genus *Cephalorhynchus*. It also appears to me equally plain that it is not identical with the preceding species, *C. heavisidei*. Hector's account is full and clear, and the essential statements in it are repeated by Hutton, who appears to have written from his own knowledge. The latter writer states that it is "abundant all around the coasts of New Zealand," while Hector affirms that the different individuals observed were very uniform in color.

The species differs from *C. heavisidei* chiefly in having the whole head white, and in having a dorsal fin ovate rather than triangular in outline. The cervical vertebræ are represented to be anchylosed together into a single mass, but this is probably an error.

The skull apparently very closely resembles that of *C. heavisidei*, but is larger, with wider nares. The pterygoids, according to Hector's figure, are large and constricted at the base somewhat as in *C. eutropia*.

The entire animal would appear to be larger than *C. heavisidei*. Hutton gives its length as from 4 to 5 feet. The latter dimensions are not reached by any of the specimens of *C. heavisidei* thus far acquired, so far as I am aware.

The skulls of *Cephalorhynchus* from New Zealand in the Paris Museum are larger than those from the Cape of Good Hope. The rostrum in the former occupies one-half the total length, but in the latter only about 46 per cent. It is possible that the New Zealand skulls belong to the species under discussion.

The relations of these two species to a third recently discovered will now be considered. This species is

CEPHALORHYNCHUS HECTORI (Van Beneden).

Electra hectori, Van Beneden, Bull. Acad. R. Belgique, 3d ser., I, 1881, pp. 877-887, Pl. II.

The specimen figured and described by Professor Van Beneden was captured in New Zealand waters. His admirable figures and description leave no room for doubt as to its generic position, but its specific relationships are not so readily made out.

Externally the specimen differs from the figures of *C. heavisidei* in having an ovate dorsal fin, and in that the throat and lower jaw are white rather than black. On the other hand, it lacks the white forehead of *C. albifrons*, but agrees with that species in the shape of the dorsal fin. The skull, according to Professor Van Beneden, agrees perfectly with that figured in the *Ostéographie*, Pl. XXXVI, fig. 1, which seems undoubtedly to belong to *C. heavisidei*. The vertebral formula, however, does not agree exactly with that of *C. heavisidei*. In the latter species the normal formula is probably as follows: C. 7, D 13, L. 15, Ca. 30=65. Van Beneden's specimen gives the following formula: C. 7, D. 14, L. 15, Ca. 27=63.

Regarding the differences, it may perhaps be said that the last-mentioned is due to individual variation. The color of the head and the shape of the dorsal fin on the contrary can scarcely be so regarded. But the color of the head is most like that of *C. heavisidei*, while the shape of the dorsal fin resembles that of *C. albifrons*. To put it in either of these species, therefore, we must disregard one or the other of the distinctions. For the present, it appears to me, it must stand as an independent species, and I have ranked it as such in the *Synopsis*, though with some misgivings, arising from geographical considerations.

CEPHALORHYNCHUS EUTROPIA (Gray).

Delphinus eutropia, Gray, Proc. Zool. Soc. London, 1849, p. 1.
Eutropia dickiei, Gray, Proc. Zool. Soc. London, 1866, p. 215.
Tursio eutropia, Gray, Cat. Seals and Whales, 1866, p. 262.
Cephalorhynchus eutropia, Dall, in Scammon's Marine Mamm., 1874, p. 289.

The only specimens of this species hitherto recorded are the two skulls in the British Museum reported to have come from the coast of [illegible]. Of these the type (No. 936*a*) is somewhat the smaller, but

otherwise is practically identical with the second specimen (No. 936*b*). While in London I purchased of Mr. E. Gerrard another specimen of the species, also said to have been received from the coast of Chili. This skull (No. 21167) is intermediate in size between the two in the British Museum and resembles them very exactly, although the tooth-line is a trifle longer. The number of teeth is the same, viz, $\frac{31-32}{32-31}$. The type specimen (936*a*) appears to have somewhat smaller temporal fossæ than the other two; it may be a female.

In cranial characters this species appears to differ from *C. heavisidei* principally in having the pterygoids longer and more closely approximated at the base. The brain-case also appears to be considerably narrower and the teeth slightly more numerous. The skull is larger than that of *C. heavisidei*.

We know nothing of the skeleton or external form of this species.

Table of measurements.

CEPHALORHYNCHUS EUTROPIA.

Catalogue number.	Collection.	Type of—	Locality.	Sex and age.	Total length.	Length of beak.	Breadth of beak— At base of maxillary notches.	Breadth of beak— At its middle.	Breadth of intermaxillæ at middle of beak.	Greatest breadth between outer margins of inter-maxillæ proximally.
					Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*
936*a*	Brit. Mus	*D. eutropia*	Chili		36.7	19.7	8.6	6.7	3.2	6.6
936*b*	do		do		32.8	17.3	7.2	5.3	2.3	5.3
21167	U. S. Nat. Mus.		(?) Chili		34.3	18.7	7.6	6.1	2.5	5.8

Catalogue number.	Length of tooth-line.	Last tooth to base of maxillary notches.	Extremity of beak to— Anterior margin of superior nares.	Extremity of beak to— End of crest of pterygoid.	Breadth between— Orbits.	Breadth between— Hinder margins of temporal fossæ.	Temporal fossæ. Length.	Temporal fossæ. Depth.	Length of mandible.	Length of symphysis of mandible.	Length of tooth-row of mandible.	Depth between angle and coronoid process.	Diameter of largest tooth.	Number of teeth.
	Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*		
936*a*	16.9	3.8	22.6	.....	15.2	14.2	6.8	6.0	30.0	3.0	.....	6.6	0.25	$\frac{30-30}{30-31}$
936*b*	14.4	3.5	19.1	21.0	13.1	13.2	6.7	6.0	26.7	2.7	15.2	5.5	0.25	$\frac{31-30}{28-30}$
21167	16.2	2.5	21.1	23.4	13.9	13.7	6.7	5.6	27.7	.....	.....	5.6	.....	$\frac{31-32}{32-31}$

11. NEOMERIS Gray.

Neomeris, Gray, Zool. Erebus & Terror, 1846, p. 30.

This genus appears to have but one character to distinguish it from *Phocæna*, namely, the absence of a dorsal fin. I was unable to discover any peculiarities in the skull or the remainder of the skeleton which could be regarded as sufficient to warrant a separation from the latter genus. Is the absence of a dorsal fin a sufficient generic character? I believe that it is, or at least must be so regarded until we know more of the anatomy of *Neomeris*. The case is somewhat different from that of *Leucorhamphus*, because in that genus we find the absence of a dorsal fin correlated with certain characters in the skeleton. In *Neomeris* no similar correlation has been pointed out. On the other hand, the dorsal fins of the three species of *Phocæna* show no signs of degeneration and furnish us no steps by which to descend to *Neomeris*. It may be, however, that when the anatomy of *Neomeris* is known many new distinctions will be discovered. In the present state of knowledge I would adopt Professor Flower's conservative course, and leave the genus to be sustained or set aside by later investigations.

Only a single species is recognized in the following pages, viz, *N. phocænoides* (Cuvier).

NEOMERIS PHOCÆNOIDES (Cuvier).

Delphinus phocænoides, Cuvier, Règne Anim., 2d ed., I, 1829, p. 291.
Delphinus melas, Temminck, Fauna Japon., Mammif. marin., 1850, p. 14, pls. 25–26.
Delphinapterus molagan, Owen, Trans. Zool. Soc. London, VI, 1869, p. 24.
Neomeris phocænoides, Gray, Zool. Erebus & Terror, 1846, p. 30, Malm. Sven. Akad. Handl., n. f., IX, I, 1870, p. 77.
Neomeris kurrachiensis, Murray, Ann. & Mag. Nat. Hist., 5th series, XIII, 1884, p. 351.

The three specimens of this animal which fell under my notice are as follows:

MUSEUM D'HIST. NAT., PARIS.

No. A. 3087. Skull. Coast of Malabar. Dussumier. Type of *D. phocænoides* Cuvier.

No. A. 3086. Skull. Cape of Good Hope.

LEYDEN MUSEUM.

Skeleton. Japan. Brüger. Type of *D. melas* Temminck.

These three skulls agree well together, but in Temminck's specimen the beak is somewhat the longest, while the breadth of the brain-case is least. In this skull the thickened portion of the intermaxillæ in front of the nostrils rises very high. Distally the intermaxillæ are flat. The foramen magnum is large, lozenge-shaped, and a little higher than broad. The condyles are widely separated.

The total length of this skeleton is 128^{cm}. I counted the following vertebræ: C. 7, D. 13, L. & Ca., 43 = 63. The atlas and axis are united,

The transverse processes of the former are much less developed than in *Phocæna*. The inferior transverse processes of all the cervical vertebræ are rudimentary. In the seventh cervical the superior transverse process ends in a facet to which is attached a short rudimentary cervical rib. The superior transverse process of the sixth cervical is short and tubercular. The first seven ribs have heads which touch the centra of the vertebræ. The neural spines, which are broad and low in the dorsal region, are obsolete in the neck. The sternum is very short and broad, and has four pairs of ribs articulated with it. The transverse processes become obsolete at the forty-third vertebra and the neural at the forty-seventh vertebra. Seventeen chevron bones are present. The skeleton is described by Temminck at some length, and I am therefore spared the necessity of giving a complete account of it.

In 1884 Mr. F. A. Murray described an animal of this genus from the Sind coast, which he made the type of a new species, *N. kurrachiensis*. Such of his measurements of the skull as may be compared with those which I have recorded indicate a correspondence in proportions between his specimens and the type of *N. phocænoides*, and I find nothing in the description to show that his specimen was specifically distinct from the latter species. The small rudimentary teeth at the extremity of the alveolus are indicated in Temminck's figure. The dorsal area of spiny tubercles is also indicated in Temminck's figure of the exterior. The purplish-red patch on the throat is not mentioned by Temminck, but even if the two specimens differ in this respect, they could scarcely, on that account alone, be regarded as specifically distinct. I believe that we may regard Mr. Murray's description as applying to *N. phocænoides*.

Mr. Murray's measurements are as follows:

	Inches.
EXTERIOR:	
Length along curves from tip of snout to notch between caudal flukes	52
Length straight	45
Tip of snout to pectoral fin	1.0
Caudal flukes	9 × 3.
Distance of blowhole from tip of snout along curve	6.5
Distance from angle of mouth to eye	1.62
Vent from root of caudal fin	14.0
SKULL:	
Length of skull over curves to upper edge of foramen magnum	10.
Length straight from below	8.
Height of skull (vertex of superoccipital)	4.25
Tip of snout to blowhole	4.25
Tip of snout to interparietal	6.25
Interparietal to upper edge of foramen magnum	3.75
Across maxillaries	4.75
Across blowhole	1.5
Length of malar	2.0
Length of brain cavity	4.0
Across paroccipitals	3.37
Greatest space between occipital condyles (upper)	1.5

SKULL—Continued.	Inches.
Smallest space between occipital condyles at lower third	1.0
Vertical diameter of foramen magnum	1.75
Breadth across last teeth on each side of upper jaw	2.5
Breadth across last tooth on each side of lower jaw	2.5
Teeth line in upper and lower jaws	2.5
Length of lower jaw at coronoid process	5.62
Greatest vertical depth of ramus	2.62
Palate	4.0

Owen's *Delphinapterus molagan*, from the vicinity of the Cape of Good Hope, belongs apparently to this species.

N. phocænoides appears to have a wide range, extending at least from the Cape of Good Hope to Japan.

Table of measurements.

NEOMERIS PHOCÆNOIDES.

Catalogue number.	Collection.	Type of—	Locality.	Sex and age.	Total length.	Length of beak.	Breadth of beak— At base of maxillæ notches.	Breadth of beak— At its middle.	Breadth of intermaxillæ at middle of beak.	Greatest breadth between outer margins of intermaxillæ proximally.
					Cm.	*Cm.*	*Cm.*	*Cm*	*Cm.*	*Cm.*
n. n.	Mus. Pays-Bas.	*D. melas*	Japan	...	22.8	8.4	†6.7	4.7	2.7	4.0
*a*3086	Mus. d'Hist. nat.	*N. phocænoides*	Cape G. Hope	....	18.8	6.2	6.6	4.3	2.5	3.4
*a*3087	....do		Malabar	....	18.8	6.3	6.3	4.4	2.5	3.0
(*)		*N. kurrachiensis*	Sind coast	....	20.3	.....	...	.....	.....	.....

Catalogue number.	Length of tooth-line.	Last tooth to base of maxillary notch.	Extremity of beak to— Anterior margin of superior nares.	Extremity of beak to— End of crest of pterygoid.	Breadth between— Orbits.	Breadth between— Hinder margins of temporal fossæ.	Temporal fossæ. Length.	Temporal fossæ. Depth.	Length of mandible.	Length of symphysis mandible.	Length of tooth-row of mandible.	Depth between angle and coronoid process.	Breadth of anterior nares.	Number of teeth.
	Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	
n. n.	7.2	2.0	12.1	12.7	12.0	11.8	5.9	†3.8	17.0	1.5	.....	.....	.....	{18—18 / 15—15‡
*a*3086	5.6	1.8	9.7	.....	10.4	.....	5.6	3.1	13.2	1.5	.....	3.8	2.5	{18—19 / 17—19
*a*3087	5.7	1.6	9.4	9.4	10.4	10.7	4.6	2.8	13.5	1.5	.....	3.8	2.5	{0—17 / 17—18
(*)	6.3	.....	6.2	.....	†12.1	....	.....	.....	.....	.....	6.3	†6.7	.....	.....

* From Murray. † Least. ‡ Or {18—18 / 17—17}

12. PHOCÆNA Cuvier.

Phocæna, Cuvier, Règne Animal, I, 1817, p. 279.

The genus *Phocæna* is readily distinguishable from all the remaining genera of the family, except *Neomeris*, by the shape of the teeth. From the latter genus it differs in having a dorsal fin.

Professor Flower's admirable diagnosis holds good for all the species, except, as I have already pointed out elsewhere,* for one observed in the North Pacific by Mr. Dall, which I have named *P. Dallii*. In this species the number of vertebræ rises to ninety-seven or ninety-eight, and the dorsal fin is falcate. In these characters the species shows affinity to *Lagenorhynchus*, but, on the other hand, the skull (the only portion of the skeleton preserved) is that of a *Phocæna*.

Putting aside the number of vertebræ and the form of the dorsal fin, we still have in the form of the teeth, the shape and position of the pterygoids, the form of the premaxillæ, and the presence of a dorsal fin, sufficient characters for the differentiation of the genus.

I have elsewhere stated my opinion that the number of valid existing species of this genus is probably reducible to four, viz, *Phocæna communis* Lesson; *Phocæna lineata* Cope; *Phocæna spinipinnis* Burmeister; *Phocæna dallii* True. *P. pectoralis* Peale, I have shown in another part of this work to be probably identical with *Lagenorhynchus electra* Gray (p. 101). *P. tuberculifera*, Gray, was finally admitted by that author to be the same as *P. communis* Lesson. *P. brachycion*, Cope, and *P. vomerina*, Gill, have never been proven identical with *P. communis*, Lesson, but Professor Flower, in 1883, expressed the opinion that such was probably the truth, and I have myself reached that conclusion. As regards the identity of *P. lineata*, however, the material at command is scarcely sufficient to warrant any very positive assertions. The type-skeleton is missing and nothing but the painted cast remains, and it is evident that to base any conclusions upon the color of a painted cast alone is hazardous. Special difficulty attends the discrimination of species in this genus, because both the body as a whole and the skeleton are subject to great variations in proportions and details of form.

The characters drawn from the relation of the vomer to the palatines, which are employed by Professor Cope and Dr. Gill in the separation of the different nominal species, are valueless.† To find other characters is a task to which I have devoted my attention, but thus far without success. I am constrained for the present to look upon *P. communis*, *brachycion*, *lineata*, and *vomerina* as identical.

The species here recognized are, therefore, *Phocæna communis* Lesson, 1827; *Phocænas pinipinnis* Burmeister, 1865; *Phocæna dallii* True, 1885.

* Proc. U. S. Nat. Mus., VIII, 1885, pp. 95–98.

† Cope, Proc. Acad. Nat. Sci. Philadelphia, 1876, p. 134. Gill, l. c., 1865, p. 178. I should state, however, that Dr. Gill has informed me that he no longer places any confidence in these characters.

PHOCÆNA COMMUNIS Lesson.

Delphinus phocæna, Linné, Syst. Nat., 10th ed., 1758, p. 77.
Phocæna communis, Lesson, Man. de Mammalogie, 1827, p. 413. (*Fide* Flower.)
Phocæna brachycium, Cope, Proc. Acad. Nat. Sci. Phila., 1865, p. 279.
Phocæna vomerina, Gill, Proc. Acad. Nat. Sci. Phila., 1865, p. 178.
† *Phocæna lineata*, Cope, Proc. Acad. Nat. Sci. Phila., 1876, p. 135.

Of Phocænas from the east coast of America there are in the national collection three complete skeletons, two of young individuals and one of an adult; four additional skulls; and three casts from fresh specimens. Of *P. vomerina* there is one young skeleton and three skulls. There are also in this collection the type-cast of *P. lineata* and a skeleton and two skulls of *P. communis*.

All the specimens from the east coast, except No. 16610, Cape May, N. J., adult ♀, are from Eastport, Me., and are not adult. The number of vertebræ in the three skeletons is as follows:

(*a*) No. 13301, Eastport, Me., C. 7; D. 13; La. & Ca. 44=64.
(*b*) No. 13305, Eastport, Me., C. 7; D. 12; L. & Ca. 22 + *=?.
(*c*) Unnumbered, Eastport, Me., C. 7; D. 13; L. & Ca. 46=66.
(*d*) No. 16610, ♀, Cape May, N. J., C. 7; D. 13; L. & Ca. 47=67.

In the skeleton of *P. vomerina* the formula is as follows:

(*e*) No. 14331, California, C. 7; D. 12; L. & Ca. 45 (+1)†=65 (or 66).

Three skeletons from the European coast, mentioned by Fischer, have the vertebræ as follows:

(*f*) C. 7; D. 13–14; L. & Ca. 45–48=65–69.

It is evident that no character can be derived from differences in the number of vertebræ.

In all the American skeletons the caudal artery first perforates the thirty-ninth vertebra counting from the last vertebra. This is, however, a character of no value in differentiating *P. communis*, since in the skeleton figured by Van Beneden and Gervais (Ostéog., Pl. LV) the first perforation is in the thirty-eighth vertebra.

In his paper in the Proceedings of the Philadelphia Academy, 1876, Professor Cope brings forward the shape of the portion of the vomer visible behind the palatines as a specific character. In two of the four skulls from Eastport the vomer appears behind the posterior margin of the palatines, while in the remaining two it does not. The same is the case as regards the four skulls from the Pacific coast: in two it appears, in the others, not. In one of the skulls of *P. communis* figured by Van Beneden and Gervais, the vomer is visible, in another it is not. It is certain, therefore, that this character, as already stated, is valueless.

As regards the other characters given by Professor Cope for his *P. brachycium*,—the shape of the muzzle, the prenarial triangular area,

* Most of the caudal vertebræ are lacking.
† The last rudimentary vertebra is evidently lacking.

the proximal ends of the premaxillæ, the nasals, and the portion of the vomer visible on the palatine surface,—I find that no two of the Eastport skulls agree. They can therefore scarcely be regarded as of importance in distinguishing the species.

In the List of the Cetacea in the British Museum,* Professor Flower intimates that the skull of *P. vomerina* is larger than any other Phocæna skull in that collection. In looking over our own series, I was at first struck by the size of two of the skulls of *P. vomerina*, but on comparing M. Fischer's measurements I find that neither of these is as large as that of his specimen "*D. Femelle très adulte*,"† nor are they as large as Malm's specimen "t."‡ The largest skull of *P. vomerina*, No. 9078, from Puget Sound, is 29.3^{cm} long, but it does not show any considerable occipital crest nor other signs of age; while, on the other hand, No. 16610, an adult female of *P. brachycium* from Cape May, N. J., though only 26.6^{cm} long, has the crest strongly developed. That this fact is without significance, however, appears from the consideration of two other skulls, both of which are 26.6^{cm} long. One of them, No. 9164, is from Eastport, Me., and should represent *P. brachycium;* the other, No. 9077, is from Puget Sound, and represents *P. vomerina.* The latter has the sutures between the elements of the occipital closed, while in the former they are still open. The crest also is rather more pronounced in *P. vomerina.* We have here, therefore, a fact exactly opposed to that just presented, namely, in two skulls of equal size that of *P. vomerina* appears to be the older, and might be presumed, therefore, to be the smaller species. It appears, therefore, that the absolute size of the different skulls gives us no grounds for the distinction of species.

As regards proportions, there can be no question that the girth of the body of the specimen which Professor Cope called *P. lineata*, as compared with its length, is much less than in the specimen from Eastport, with which he compared. But it should be held in mind that the latter is only 43½ inches long, while the type of *P. lineata* is 70 inches long. The former is evidently very young, since a skeleton (No. 13301, from Eastport), which measures fully 46 inches, has the sutures defining the limits of the elements of the occipital still open.

The large size of the head and the thickness of the body I look upon as fœtal characteristics not yet outgrown.

It is manifestly unwise to compare the type of *P. lineata*, which shows evidence of being adult, with so young an individual as the Eastport specimen. Fortunately we have two other casts nearly equaling the type of *P. lineata* in length. Of the larger of these, No $\frac{13359}{16610}$, an adult female, we have the entire skeleton. In the following table are compared the

* List of the Cetacea in the Brit. Mus., 1885, p. 16.

† Fischer, Actes Linn. Soc. Bordeaux, XXXV, 1881, p. 165.

‡ K. Svenska Vetens. Akad. Handling., new ser., IX, i, 1871, p. 75.

proportions of this specimen and the type of *P. lineata*, the measurements in both cases being from the casts:

Measurements.	13339. Adult ♀. Cape May, N. J.	12481. ♀. New York Harbor. (Type of *P. lineata*.)
	Inches.	*Inches.*
Total length	68.0	70.0
Extremity of snout to eye	6.5	7.0
Extremity of snout to blowhole	7.0	7.0
Extremity of snout to corner of mouth	4.75	4.75
Extremity of snout to anterior base of pectoral	13.0	14.5
Extremity of snout to anterior base of dorsal	29.0	30.0
Vertical height of dorsal	4.0	3.75
Length of pectoral	7.0	7.25
Greatest width of pectoral	3.5	.....
Width between points of flukes	12.5	15.5

Considering the variation in proportions occurring in this genus, I think it will be admitted that the proportions in these two individuals are remarkably similar, and that No. 13339 must be identified as *P. lineata*, if such a species exists. But the skeleton of this individual (osteological No. 16610) is at command and it exhibits no characters by which it may be distinguished from a skeleton of *P. communis* from European waters. It is therefore strongly probable that the missing skeleton of the type of *P. lineata* was likewise identical with that of *P. communis*.

The measurements of *P. vomerina* given by Scammon are taken from two individuals, one 4 feet 8 inches long, the other but 4 feet.* In a skeleton from California, which is 4 feet long, the suture between the atlas and axis is plainly visible, the epiphyses of the centra are free, and the elements of the occipital are distinct. It is proper, therefore, to hold that Scammon's specimens were both young, and to compare them only with young specimens from the Atlantic. When we come to examine Scammon's measurements, however, we find the differences in the proportions of the two individuals so great that we can not hope for any satisfaction in comparing them with Atlantic specimens. It is true that Scammon's two specimens belonged to opposite sexes, but the differences are too great to be ascribed to difference of sex. For example, in the female, which was 48 inches long, the width of the pectoral fins was as great, the height of the dorsal greater, and its length along the back as great as in the male, which was 56 inches long. In the small female, also, the distance from the extremity of the snout to the eye was as great as, and to the blowhole greater than, in the larger male. In comparing these specimens with others from the Atlantic, therefore, we shall be at a loss to determine whether the differences observable are to be regarded as indicating specific distinctness or as being due to individual variation. As the Atlantic Phocænas

* Marine Mammalia, p. 96.

also vary greatly in proportions, we shall gain nothing by comparison. On this point we must await the result of future investigations

We turn finally to the question of color. The color of *P. lineata* is accurately described by Professor Cope (l. c.). The back upper half of the head, posterior part of the tail, flukes, and pectoral fins are black. The sides are pinkish and the belly is white. A black line passes from the base of the pectoral fin to the corner of the mouth. The edges of the lower lip are black. The Cape May female and another female specimen, 5 feet 1 inch long, have nearly the same coloration, except that the sides are yellowish instead of pink and the light color of the belly extends nearly to the flukes and leaves only a slight band of dark color around the lower lip. The Cape May specimen also has no dark band from the pectoral fin to the mouth, but it exists in the second female. Are these differences in color sufficient to warrant the separation of *P. lineata*?

M Fischer's figure of an old female (Pl. VII, fig. 1) agrees in coloration and form with the cast of *P. lineata*, except that the sides are gray instead of pink and that the band of color from the pectoral fin to the mouth is broad and gray instead of narrow and black.

In point of color, Scammon's description of *P. vomerina* is applicable to M. Fischer's specimens of *P. communis*. I subjoin Scammon's description of the female of *P. vomerina* and the description by Lafont of a female of *P. communis*:

P. vomerina (female).

The female is of the same color above (black); it is lighter on the sides, with a narrow black streak running from the corner of the mouth to the pectorals, and the lower portion of the animal is of a milky whiteness; yet the pectoral and caudal fins are black underneath or of a dark gray. [Scammon, Marine Mam., p. 95.]

P. communis (female).

Dos noir; flancs d'un gris de fer jaspé de blanc; abdomen d'un blanc un peu grisâtre; pectorals noires; une ligne noire, très étroite, part de leur attache et se dirige vers la commissure labiale; rostre noir. (Lafont.) [Fischer, l. c., p. 165.]

It will be observed that Lafont's specimen only differs in having the white of the belly "un peu grisâtre." In another specimen this region was white, as in Scammon's *P. vomerina*.

Summing up the available evidence I find no reason to regard *P. brachycion* or *P. vomerina* as distinct from *P. communis*. *P. lineata*, if distinct, differs only in color, a character which in this genus must be looked upon with distrust.

Table of measurements.

PHOCÆNA COMMUNIS.

Catalogue number.	Collection.	Type of—	Locality.	Sex and age.	Total length.	Length of beak.	Breadth of beak— At base of maxillary notches.	Breadth of beak— At its middle.	Breadth of intermaxillæ at middle of beak.	Greatest breadth between outer margins of intermaxillæ proximally.
					Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*
9164	U. S. Nat. Mus	.....	Eastport, Me	Jr.	26.5	11.6	7.5	4.7	2.2	3.5
13305	....do	.....	....do	Jr.	24.4	10.0	7.3	4.1	2.0	3.7
13301	....do	.....	....do	Jr.	23.7	10.0	7.1	4.0	1.9	4.0
9157	....do	.....	....do	Jr.	24.7	9.8	6.8	4.1	2.0	4.1
9078	.. do	.....	Puget Sound	Ad.	29.3	13.7	8.5	5.5	2.5	4.2
9077	....do	.....	....do	..	26.5	11.7	7.7	4.7	2.2	3.6
2965	Roy. Col. Surg	*P. tuberculifera*..	Brighton, Eng.	♀	26.4	10.7	7.8	5 0	2.5	3.6
2970	....do	.....	.....	..	26.2	10.9	7.5	4.8	2.4	3.4

Catalogue number.	Length of tooth-line.	Last tooth to base of maxillary notch.	Extremity of beak to— Anterior margin of superior nares.	Extremity of beak to— End of crest of pterygoid.	Breadth between— Orbits.	Breadth between— Hinder margins of temporal fossæ.	Temporal fossæ. Length.	Temporal fossæ. Depth.	Length of mandible.	Length of symphysis of mandible.	Length of tooth-row of mandible.	Depth between angle and coronoid process.	Breadth of crown of largest tooth.	Number of teeth.
	Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	
9164	10.0	2.1	14.7	.....	11.9	.....	6.0	4.1	.....	.....	.....	.....	.....	$\frac{26-26}{?-?}$
13305	8.9	1.8	12.8	14.8	12.1	.....	.....	3.5	18.4	2.5	.....	5.0	2.6	$\frac{27-25}{26-25}$
13301	8.6	2.0	12.6	14.5	11.3	.....	4.2	3.5	18.1	2.0	.....	4 7	3.5	$\frac{26-25}{27-24}$
9157	8.2	2.0	12.8	.....	11.4	.....	4.6	3.6	.....	.....	.....	.....	.....	.....
9078	11.8	2.2	18.1	19.4	13.7	13.9	6.0	4.3	23.1	2.9	.....	6.4	3.5	$\frac{28-27}{25-26}$
9077	9.9	2.4	14.8	16.4	12.3	.....	5.9	4.0	20.1	2.8	.....	5.4	.....	$\frac{27-26}{26-25}$
2965	9.4	2.1	14.7	16.2	12.7	12.8	6.3	3.8	21.6	2.9	9.4	5.7	.....	$\frac{21-20}{23-22}$
2970	9.8	2.0	14.2	15.9	11.6	.....	.....	.....	20.1	2.4	9.4	5.3	.....	$\frac{?-26}{24-25}$

PHOCÆNA SPINIPINNIS Burmeister.

Phocæna spinipinnis, Burmeister, Proc. Zool. Soc. London, 1865, p. 228; An. Mus. Pub. Buenos Aires, I, 1864–69, pp. 380–388, Pls. XXIII–XXIV.

No one who has read Dr. Burmeister's description of this species and compared his measurements and figures with those of *P. communis* can doubt its distinctness. The black color, the peculiar form of the dorsal fin and its position, the large size of the pectoral fins, and the small number of teeth, are all characters which it is impossible to set aside.

The type-specimen, though very young, measured 162cm in length, which would indicate that the species is larger than *P. communis*.

In the following table a part of Dr. Burmeister's measurements of the skull and exterior are placed in juxtaposition with the measurements of a male specimen of *P. communis* given by M. Fischer, and of a skull of *P. communis* from Puget Sound, in the national collection.

Measurements of the exterior.

Measurements.	*P. spinipinnis*, ♂, type (from Burmeister).	*P. communis*, male (from Fischer).
	Cm.	*Cm.*
Total length	162.0	164.0
Length of the mouth	8.5	13.0
Distance from extremity of snout to blowhole	16.0	17.0
Distance from extremity of snout to dorsal fin	90.0	72.0
Height of dorsal fin	12.5	13.0
Distance from extremity of snout to pectoral	32.0	30.0
Length of pectoral fin	26.0	19.0
Breadth of flukes	39.0	42.0

Measurements of the skull.

Measurements.	*P. spinipinnis*, ♂, type (from Burmeister).	*P. communis*. Puget Sound U. S. Nat. Mus.
	Cm.	*Cm.*
Length of the skull, from the surface of the occipital condyles to the extremity of the beak	29.0	29.3
Length from the condyles to the posterior wall of the nares	12.0	11.0
Length of the beak from its extremity to the root of the malar	12.2	13.9
Breadth of the skull between the postorbital processes of the frontal	16.2	16 6
Breadth of the foramen magnum	3.5	2.9
Height of the foramen magnum	3.7	2.7
Height of the skull, from the lower edge of the occipital condyles to the crest	11.0	11.2
Breadth of the beak at the base	8.0	8.6
Breadth of beak at middle	5.5	5.4
Breadth of the nares	3.6	3.4
Distance from the lower border of the foramen magnum to the pterygoids	11.0	9.9
Length of the alveolar border	7.0	11.8
Length of the lower jaw	21.2	23.0
Length of its symphysis	2.0	2.9
Height between the angle and coronoid process	6.0	6.3

It is probable that the skeleton of this species when known will be found to differ considerably from that of *P. communis*.

PHOCÆNA DALLII True.

Phocæna dallii, True, Proc. U. S. Nat. Mus., VIII, 1885, pp. 95-98, Pls. II-VI.

Since the publication of my description of this species the National Museum has received a second skull from Lieut. Commander H. E. Nichols, who obtained it at Hoonyah Sound, Alaska.* This specimen and the

* There is also a skull of this species (No. 3961) in the Berlin Anatomical Museum. It was obtained by Chamisso, but the exact locality is not given.

type-skull, when compared with a skull of *P. communis*, present a number of characters by which the two species are readily distinguishable. The skulls of *P. Dallii* are remarkable for their short, flat beaks and great breadth between the orbits. The intermaxillæ are higher in front of the nares than in *P. communis*, and nearly flat superiorly. The triangular area in front of the nares is raised above the level of the surrounding surface and the foramina on either side do not open into deep, narrow grooves as they do in *P. communis*. The intermaxillæ are separated at their inner margins by a wide space, and at the bottom of the trough the vomer is plainly visible. The region of the skull between the nares and the occipital crest is nearly at right angles with the plane of the beak. The nasal bones have the form of two transverse, prominent bosses. The occipital bone is exceedingly large and broad, as compared with that of *P. communis;* the temporal fossæ are small, and the squamosal are short and thick. The nares, both superior and inferior, are very large.

These differences in the skull—and they are but a few of those which are discernible—together with the differences in external appearance, separate this species very clearly from *P. communis*, and there can be no doubt that it is distinct and valid.

I repeat in this connection the measurements of the exterior given in my previous paper on this species:

Measurements of the exterior of a specimen of Phocæna dallii captured off Adakh Island, August 13, 1873.

[These measurements are in straight lines, the curves of the body being excluded.]

	Inches.
Total length	72.0
Tip of lower jaw to corner of mouth	3.5
Tip of lower jaw to center of eye	7.0
Tip of lower jaw to ear	9.5
Tip of lower jaw to front edge of pectoral at its insertion	11.0
Tip of lower jaw to back edge of pectoral at its insertion	14.0
Tip of lower jaw to anterior edge of blowhole	9.0
Eye to spouthole (vertical)	4.0
Across base of pectoral	5.5
Anterior base of pectoral to tip	8.0
Posterior base of pectoral to tip	5.75
Tip of lower jaw to anterior boundary of the white area	27.3
Spouthole to anterior edge of dorsal	18.5
Height of dorsal	6.0
Length of base of dorsal	10.5
Length posterior margin of dorsal	7.5
Tip of lower jaw to genital slit	43.0
Length of genital slit	3.0
Genital slit to anus	4.25
Anus to notch of the flukes	22.75
Breadth of flukes (transverse)	18.5
Length of flukes (antero-posterior)	5.25
Breadth of narrowest part of tail before the flukes	1.75

	Inches.
Height of body at same point	3.5
Length of eye	.75
Width of spouthole	1.87
Extension of white area posterior to the anus	6.5
Length of white area along the belly	18.0
Width of head at corner of the mouth	5.5
Depth of body 24 inches anterior to the flukes (at which point the keels are widest)	10.0
Depth 8 inches anterior to flukes	7.5
Navel to anterior end of genital slit	7.5

Measurements of two skulls of Phocæna dallii.

Measurements.	No. 21762 *P. dallii*; Adakh Id., Alaska. Type.	No. 22566 *P. dallii*; Hoonyah Sound, Alaska.
	Cm.	*Cm.*
Total length	33.3	31.4
Length of beak	14.0	12.6
Breadth of beak at base of notches	9.5	9.8
Breadth of beak at its middle	5.7	6.1
Breadth of intermaxillaries at same point	3.5	3.2
Greatest breadth between outer margins of intermaxillaries proximally	5.1	6.0
Length of tooth-line	12.7	11.9
Last tooth to base of maxillary notch	2.2	1.7
Tip of beak to anterior margin superior nasal opening	17.8	17.2
Tip of beak to end of crest of pterygoid	21.3	19.3
Breadth between orbital processes of frontal	16.5	16.5
Breadth between hinder margins of temporal fossæ	16.2	17.2
Length of temporal fossa	5.6	4.0
Depth of temporal fossa	2.6	3.0
Total length of mandible	25.5	24.0
Length of symphysis of mandible	3.8	3.8
Length of tooth row of mandible	12.2	11.2
Depth between angle and coronoid process	5.7	6.3
Number of teeth	{23–23 / 27–27}	{28–27 / 24–25}

14. GRAMPUS Gray.

Grampus, Gray, Spic. Zool., 1828, p. 2; Zool. Erebus & Terror, 1846, p. 30.

GRAMPUS GRISEUS (Cuvier).

Delphinus griseus, Cuvier, Ann. Mus., XIX, 1812, p. 14, pl. 1, fig. 1.
Delphinus Rissoanus, Desmarest, Mammalogie, 1822, p. 519.
Grampus Cuvieri, Gray, Ann. Nat. Hist., 17, 1846, p. 85.
Grampus Souverbianus, Fischer, Act. Linn. Soc. Bordeaux, XXXV, 1881, p. 210.
Grampus sakamata, Gray, Zool. Erebus & Terror, 1846, p. 31.
Grampus Stearnsii, Dall, Proc. California Acad. Sci., v, 1813, p. 13.
Globiocephalus Rissii, Anon., Chinese Repos., vi, 1838, p. 411–414.
Globiocephalus Chinensis, Gray, Cat. Seals and Whales, 1866, p. 323.

M. Fischer* and Professor Flower† having discussed at length the question of the identity of *G. griseus* and *G. Rissoanus*, and having reached the conclusion that no distinction is to be made between the two nominal species, it is unnecessary for me to repeat the arguments, since

* Fischer, Act. Linn. Soc., Bordeaux, XXXV, 1881, p. 195, et seq.
† Flower, Trans. Zool. Soc., London, VIII, 1872, pp. 1–21, pls. 1, 2.

I find no reason to dissent from the opinion of these two eminent naturalists. I shall give attention, instead, to the question of the relationship of the specimens in our collection from the east coast of the United States, and to that of the identity of *G. Souverbianus* Fischer, *G. Richardsoni* Gray, and *G. Stearnsii* Dall.

The material in the national collection comprises four adult skeletons, ten skulls, a cast of an adult about 12 feet long, casts of two young individuals about 6 feet long, and of three adult heads. All these specimens are from Cape Cod, Massachusetts, whence they were received in the fall of 1875. Professor Cope has figured two of the heads and also an entire young individual (of which the cast is not at present to be found) in the Proceedings of the Philadelphia Academy (1876, Pl. III).

The large cast (No. 12839) is from a female, about 12 feet long. Its dimensions are as follows:

	Inches.
Total length (straight line)	130
Extremity of snout to eye	15
Extremity of snout to blowhole	17
Extremity of snout to corner of mouth	13
Extremity of snout to anterior base of pectoral fin	22
Extremity of snout to anterior base of dorsal fin	50
Length of pectoral fin along center	21½
Greatest width of pectoral fin	8½
Vertical height of dorsal fin	13½
Length of base of dorsal fin	22

The cast represents one side only of the body. The general color, covering the body and all the fins, resembles that of the portion of Professor Flower's figures between the dorsal and pectoral fins, viz, a steel-gray of medium depth and everywhere uniform. The lower lip and chin, the margin of the upper lip, and an area on the belly beneath the dorsal fin are of a light gray color, approaching white. The whole body and the fins are traversed by irregular lines of a light gray color and of varying width and length.

This individual, therefore, differs from that figured by Professor Flower in being more uniform in color, the light areas being more limited and the pectorals not mottled.

The outlines of the body are practically the same in the two specimens, but in ours the dorsal fin is less high and wider.

One of the casts of the two young individuals (No. 1), which is 68 inches long (on the curves), is exactly like the young specimen figured by Professor Flower, except in the following particulars: The upper parts are rather lighter, and the light color of the belly extends back of the anus half way to the flukes. The diagonal stripes are represented in our specimen by three vertical lines between the dorsal fin and the flukes. In the specimen figured by Professor Cope,* which was ob-

* Proc. Acad. Nat. Sci. Phila., 1876, pl. 3.

tained in the same locality, the diagonal lines are much like those represented in Professor Flower's figure.

The second young individual (No. 2), which is 73 inches long (along the curves), departs in color both from that figured by Professor Flower and that just described. The whole head, including the eyes and mouth, and to the blowhole, the belly, lower half of the tail and under side of the flukes, and pectoral fins are light yellowish, approaching white. On the upper part of the head and on the lower lip the tint approaches lemon yellow. The back and upper side of the flukes and pectoral fins are dark gray. On the lips and over the base of the pectoral fin are irregular areas of light brown.

The contour of the body in this specimen, however, is exactly that of the specimen previously described, and in spite of the difference in color I do not hesitate to assign them to the same species. The dimensions of the two specimens are as follows:

Measurements.	No. 1.	No. 2.
	Inches.	*Inches.*
Tip of snout to notch of flukes (on the curves)	68.0	73.0
Tip of snout to eye	8.5	10.0
Tip of snout to corner of mouth	8.0	8.75
Tip of snout to base of pectoral fin	13.0	16.0
Tip of snout to blow-hole	10.5	11.5
Tip of snout to dorsal fin	30.5	32.5
Length of pectoral along the center	9.75	10.0
Width of pectoral (greatest)	4.0	4.0
Width of flukes	14.75	14.50
Height of dorsal fin (vertical)	7.25	6.25
Length of base of dorsal fin	12.00	11.00

Both these specimens show the slight extension of the upper jaw over the lower jaw, which is characteristic of this genus as well as of *Globicephalus* and *Delphinapterus*.

One of the heads referred to is entirely of a lightish-gray color, except the throat, which is yellowish white. The two remaining heads are not at present accessible.

Of the four skeletons none, unfortunately, are absolutely complete, nor is the sex noted; they lack from one to three of the last caudal vertebræ. Their formulæ, with the additions which seem to be necessary to restore the original number of vertebræ, are as follows:

n. n. C. 7; D. 12; L. & Ca. 49 (? + 1) = 68 (or ? 69). Length as mounted, 9 feet 10½ inches.

n. n. C. 7; D. 12; L. & Ca. 46 (? + 3) = 65 (or ? 68). Length as mounted, 10 feet 3½ inches.

15771. C. 7; D. 12; L. & Ca. 48 (? + 1) = 67 (or ? 68). Unmounted.

15772. C. 7; D. 12; L. & Ca. 48 (? + 1) = 67 (or ? 68). Unmounted.

The two mounted skeletons agree very closely with that described by M. Fischer. There are some slight differences in the point at which

the chevron bones commence, etc., which are shown in the following table:

Characters.	M. Fischer's skeleton.	No. — U. S. N. M.	No. — U. S. N. M.	Professor Flower's skeleton.
Total number of vertebræ	68	65 (?+3)	67 (?+2)	68
Chevrons begin at vertebra number	43	38	?39	39
Chevrons end at vertebra number	58	?58	61	59
Neural spines become obsolete at number	60	59	60	57
Transverse processes become obsolete at number	54	54	54	53
Perforations for caudal artery begin at number	47	45	46	44
Phalanges:				
First finger	?1	1	----------	1
Second finger	?7	9	----------	9
Third finger	?5	7	----------	7
Fourth finger	?1	?	----------	2
Fifth finger	?0	?	----------	0

As regards the shape of the sternum, the number and shape of the sternal ribs, the shape of the acromion and coracoid and of the hyoid bones, our two skeletons agree exactly with that described by M. Fischer.

The skulls are of all ages, the younger having the elements of the occipital bone, and likewise all the other bones of the skull separate, while in the older the sutures between the palatine and maxillary bones and the maxillæ and intermaxillæ have disappeared.

In five cases the mandible is present, and there are also in the collection two additional complete jaws. In these the number of teeth is as follows: 4–4; 4–4; 4–4; 5–4; 5–4; 5–5; 6–6; which goes to confirm the truth of the remark of M. Fischer, viz:

Il est difficile de ne pas admettre une seule espèce, dont la dentition varie entre 3–4 et 6–6.*

The proportions of the adult skull described by Professor Flower agree very closely with those of one of equal size in our Museum, as is shown in the following table (Professor Flower's measurements being for convenience reduced to centimeters):

Measurements.	Professor Flower's specimen ♀.	No. 21047. Cape Cod, Mass.
	Cm.	*Cm.*
Entire length	48.8	48.7
Length of rostrum	23.6	24.6
Breadth of occipital foramen	3.8	4.7
Greatest height of occipital foramen	4.8	5.1
Breadth of occipital condyles	11.4	11.8
Greatest breadth of cranium (at parietal region in temporal fossa)	23.1	24.0
Greatest breadth of skull (at zygomatic process of squamosals)	32.8	34.2
Breadth at anteorbital processes of frontal	30.0	31.0
Breadth of anterior nareal apertures	7.1	7.6
Breadth of rostrum at base (bottom of anteorbital notch)	19.6	20.4
Breadth of rostrum at middle	11.2	11.4

To sum up the facts presented, it may be said that our specimens agree exactly with the European ones in size, and closely in color (in a

* Fischer, l. c., p. 209.

species in which the color is very variable), in osteological details and proportions, and in the number of teeth (which number is also variable). I believe, therefor, that there can be no reasonable doubt but that the grampuses of American and European waters are identical.

Grampus souverbianus Fischer.

On page 209, M. Fischer brings together the measurements of the length of ten skulls of European specimens. The largest of these is 515^{mm} long, and as this is presumably from a full-grown male, he questions whether another skull 530^{mm} long (and having indications of teeth in the upper jaw) may not be that of a distinct and larger species. He gives this skull provisionally the name of *G. Souverbianus*. But an examination of the tables of measurements on p. 132, shows that six of thirteen American skulls measured exceed 515^{mm}, while the remaining seven stand in a practically evenly-graded series below that length. I do not think, therefore, that the skull called *G. Souverbianus* can be set apart on account of its size. Its proportions are as follows:

Measurements.	G. Souverbianus. From Fischer.	Cape Cod. G. griseus. n. n.
	Mm.	*Mm.*
Total length	530	*540
From extremity of beak to anterior wall of nasal fossa	370	390
From extremity of beak to maxillary notches	295	299
Breadth of head between the postorbital process of the frontal	375	378
Breadth of the beak at its base	235	224
Breadth of the beak at its middle	150	138

* This is measured from the inferior margin of the foramen magnum, as seems to be the case in all of M. Fischer's measurements, and not from the surface of the condyles as in mine.

The teeth in *G. Souverbianus* are 3–2; in the Cape Cod specimen, 5–4. As regards the teeth in the upper jaw Fischer remarks:

On voit des alvéoles au maxillaire supérieur, mais leur fond est partie comblé.

In all the largest skulls in the national collection there are signs of these rudimentary alveoli, but it is my opinion that they are made by the pressure of the mandibular teeth against the margin of maxillæ, and that they do not indicate the previous presence of teeth. Indeed, in skull No. 16486, in which the mandible is present, it is demonstrable that these pits are made by the mandibular teeth.

The only character, therefore, brought forward by Fischer as distinguishing the type of *G. Souverbianus* is the breadth of the beak, and no one, I think, who examines the comparative measurements on p. 132, will regard this of sufficient importance to entitle the skull to a distinct specific name. I believe it to be only an oldish individual of *G. griseus*.

Grampus Richardsoni Gray.

At first sight the measurements appear to show that this skull is separable in that it has a narrow beak and narrow intermaxillæ, but in

No. 21048 of the American series (p. 132) we find a skull which has the beak relatively as narrow and the intermaxillæ both relatively and absolutely narrower. The teeth are of the same number (4–4), and as large as in the American series.

Apparently no characters of genuine importance have been brought forward to prove the distinctness of the grampus of the Cape of Good Hope, and until such are forthcoming it seems reasonable to regard it as identical with the *G. griseus* of northern waters.

Grampus Stearnsii Dall.

A mandible and two teeth are the only specimens of the west-coast grampus in the national collection. The mandible is apparently neither the No. 1 nor the No. 2 of Mr. Dall's description;* at least I can not make my measurements agree with his. The mandible is from the same locality, however, as that from which Mr. Dall's specimens were obtained, and the teeth are of the same number (3–3) as in his No. 1. It may be that I do not interpret his measurements correctly, and that this is his No. 1. The proportions of the jaw are as follows:

Measurements.	13021. Monterey, Cal. (C. M. Scammon.)	
	Inches.	Centimeters.
Total length	17.6	44.7
Length of the symphysis	1.95	4.9
Greatest depth at the symphysis	1.7	4.3
Distance from the anterior extremity of the jaw to the end of the tooth line	2.6	6.5
Vertical depth at the coronoid process	4.75	12.0

Upon examination, it appears that the coronoid process of this jaw is a little higher than is common in *G. griseus*, and the posterior portion of the ramus is somewhat less convex, but I make this statement with all reserve, however, since I have examined only about ten jaws of *G. griseus*, and in no two of these is the form identical. I know no reason why the slight differences observable in the mandible from Monterey may not be set down as indicative of individual variation merely. The teeth are of the same size and form as in *G. griseus*. The formula for the mandible under consideration is $\frac{0-0}{3-3}$; but in Mr. Dall's No. 2 there were four teeth on each side—the average number in *G. griseus*.

From the remarks of Scammon on p. 103 of the *Marine Mammalia* it would appear that the Pacific grampus has a higher dorsal fin than *G. griseus;* but neither these remarks nor the figure on page 102 merit the serious consideration of the classifier, since Scammon's observations were made not on specimens under his hand but at liberty in the sea.

We have, therefore, only the presumption that dolphins of the same genus inhabiting different seas are likely to be specifically distinct, as the basis for the separation of *G. Stearnsii* from *G. griseus*.

* Scammon, Marine Mammalia, p. 300.

Grampus sakamata Gervais.

This name was first formally used by Gray in the Zoology of the Voyage of the *Erebus* and *Terror*, page 31. It was given to a whale described by Schlegel from Japanese drawings and natural histories. Schlegel did not see any specimens of the species described, and Gray did not examine the original accounts from which Schlegel drew his description. Certainly we are getting far away from nature in this matter. Fortunately, however, Gervais applied the name to a skull of a grampus received from Japan, and thus for the first time placed the new species, if new species it be, within the reach of investigation.

In considering this skull we ought not to be influenced by Schlegel's remarks on the color, etc., of the animal represented in the Japanese drawings, because that author believed that the cetacean was a species of Killer. Gray's opinion to the contrary notwithstanding, it does not appear probable to me that the author of the concise and well-illustrated description of the Killer in the *Abhandlungen* would mistake a Grampus for a Killer. I consider the skull figured by Gervais in the *Ostéographie* (pl. LXIV, fig. 5, p. 568) as the type of the so-called *Grampus sakamata.*

Upon examining this figure, however, we are at once made aware of the inadvisability of basing species in this genus on the proportions of the skull alone, on account of the great amount of individual variation in cranial characters. Figures 4 and 5 on plate LXIV of the *Ostéographie* apparently represent skulls distinguishable specifically at a glance. But in the national collection there are two skulls which might almost have served for the basis of these two figures, yet were both obtained from Cape Cod, Massachusetts (together with many others), at the same time, and are almost unquestionably specifically identical.

We will consider a few of the proportions common to Gervais' skull of *G. sakamata* from Japan, and No. 22446 of our collection, from Cape Cod, Massachusetts, and some which are common to the skull of *G. griseus* from Concarneau, figured on the same plate, and No. 22447 of our collection, from Cape Cod. It should be remarked first, however, that both our skulls and those figured in the *Ostéographie* are from young individuals.

Proportions common to *G. sakamata* and No. 22446 U. S. N. M., from Cape Cod, Massachusetts.	Proportions common to *G. griseus* from Concarneau and No. 22447 U. S. N. M., from Cape Cod, Massachusetts.
1. Distance from left maxillary notch to extremity of rostrum equals distance from same notch to margin of maxilla, over post-orbital process of frontal.	1. Distance from left maxillary notch to extremity of rostrum equals distance from same notch to ante-orbital enlargement of frontal.
2. Length of beak equals width from base of maxillary notch to ante-orbital enlargement of opposite frontal.	2. Length of beak is less than the same width.
3. The width of the widest part of the maxillæ anterior to the notch is contained one and one-half times in the length of the beak.	3. The same width is contained one and one-fourth times in the length of the beak.
4. The greatest width of the intermaxillæ anterior to the notch is contained a little less than three times in the length from the anterior margin of the nares to the extremity of the rostrum.	4. The same width is contained but two and one-half times in distance from the nares to the extremity of the rostrum.

Unlike as these two skulls figured in the *Ostéographie* are in proportions therefore, they find their counterpart in two skulls presumably of the same species and from a single locality. It would seem that something besides proportion of the skulls must be brought forward whereby to distinguish the supposedly distinct Japanese Grampus.

I did not have an opportunity of examining the skull of *G. sakamata* when in Paris and can not affirm that it may not exhibit characters which are not represented in Gervais' figure. Until such characters are discovered, however, I do not see any reason why *G. sakamata* should be regarded as distinct from *G. griseus*.*

Globiocephalus Rissi and *G. Chinensis* Gray.

This animal, which was described by an anonymous writer in the Chinese Repository, Vol. VI, pp. 411–414, appears to be unquestionably a grampus, as is indicated by the size, the number, and the position of the teeth, and the color and markings of the skin. Gray, following Blyth, regarded it as a Blackfish, and founded his *Globiocephalus Chinensis* upon it. That it was a grampus, and probably *G. griseus*, will, I believe, be the opinion of any person who reads carefully the original description in the work mentioned.

Table of measurements.

GRAMPUS GRISEUS.

Catalogue number.	Collection.	Type of—	Locality.	Sex and age.	Total length.	Length of beak.	Breadth of beak— At base of maxillary notches.	Breadth of beak— At its middle.	Breadth of intermaxillæ at middle of beak.	Greatest breadth between outer margins of intermaxillæ proximally.
					Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*
16486	U. S. Nat. Mus.	.....	Cape Cod	Ad..	54.0	26.6	*22.0	13.7	10.4	13.3
15890	...do	.....	....do	Ad..	53.1	26 0	*20.5	12.8	9.0	14.3
15891	...do	.....	....do	Ad.†	51.5	25.9	*20.0	11.8	8.1	13.1
21048	...do	.....	....do	Ad.†	51.0	25.1	*19.7	10.9	7.5	12.8
21047	.. do	.....	....do	Ad.†	48.6	24.5	*18.9	11.4	8.3	12.2
15894	.. do	.....	....do	Jr.§	46.3	22.0	*17.1	10.3	6.8	11.4
15772	.. do	.....	....do	Jr.§	44.5	21.0	*16.8	9.6	7.7	11.1
15773	...do	.....	....do	Jr ..	33.1	13.8	*12.5	5.9	4.2	10.4
364a	Brit. Mus.	.....	Isle of Wight		43.6	20.0	18.4	9.7	7.0	12.2
364c	.. do	.....	.....		48.3	24.9	21.3	11.9	8.9	14.2
1626a	...do	*G. Richardsoni*	.....	.....						
1626b	...do	.....	Table Bay, S. Africa.	.....	47.0	24 5	19.9	9.9	7.9	11.2

* In the foot-note (*Ostéographie*, p. 563) Gervais states that there is a mandible of a grampus from Japan in the British Museum, but none is included in Professor Flower's recent list of specimens of Cetacea in that collection.

Table of measurements—Continued.

Catalogue number.	Length of tooth-line.	Last tooth to base of maxillary notch.	Extremity of beak to—		Breadth between—		Temporal fossæ.		Length of mandible.	Length of symphysis of mandible.	Length of tooth-row of mandible.	Depth between angle and coronoid process.	Diameter of mandibular teeth.	Number of teeth.
			Anterior margin of superior nares.	End of crest of pterygoid.	Orbits.	Hinder margins of temporal fossæ.	Length.	Depth.						
	Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	
16486	.....	.....	35.3	34.0	34.7	23.0	12.2	9.2	.....	.....	.....	.....	.....	.....
15890	.....	.....	35.0	33.2	34.2	24.5	13.3	6.9	.....	.....	.....	.....	.....	.....
15891	.....	.....	35.3	33.6	30.8	22.3	12.3	6.5	.....	.....	.....	.....	.....	.....
21048	.....	.....	33.2	.....	31.8	22.5	12.4	6.9	.....	.....	.....	.....	.....	.....
21047	.....	.....	32.0	30.4	31.0	20.7	13.5	8.0	.....	.....	.....	.....	.....	.....
15894	.....	.....	29.8	.....	27.0	22.1	11.4	6.7	.....	.....	.....	.....	.....	.....
15772	.....	.....	28.4	28.6	26.0	18.7	10.7	6.2	36.2	4.7	5.5	9.0	.....	§0—0 4—0
15773	.....	.....	19.1	20.5	20.1	17.1	9.5	5.1	29.0	3.1	4.6	6.7	.....	§0—0 4—4
364*a*	.....	.....	27.4	.....	27.4	20.1	11.3	4.7	33.3	2.5‡	5.8	9.4	.....	§0—0 4—4
364*c*	.....	.....	33.0	31.5	32.4	17.8	14.6	7.8	.....	.....	.....	.....	.....	.....
1626*a*	.....	.....	.....	.....	.....	.....	.....	.....	40.0	5.3	7.0	9.9	0.76	§0—0 4—4
1626*b*	.....	.....	31.1	31.5	28.4	20.1	10.9	5.7	38.5	4.7	6.6	9.5	0.76	§0—0 4—4

* Least. † Rudimentary alveoli closed. ‡ Rudimentary alveoli open. § Occipital sutures distinct.

15. GLOBICEPHALUS Lesson.

(*Globicephala* Lesson, Mamm. découverts depuis 1788, 1828, p. 441.)

GLOBICEPHALUS MELAS (Traill).

Dephinus melas, Traill, Nicholson's Journal, XXII, 1809, p. 81, pl. 3.
Delphinus globiceps, Cuvier, Ann. Mus. d'Hist. nat., XIX, 1812, p. 14, Pl. 1, 2 figs.
Globiocephalus Svineval, Gray, Zool. Erebus & Terror, 1846, p. 32.
Delphinus intermedius, Harlan, Journ. Acad. Nat. Sci. Phila., VI, 1829, p. 51, Pl. 1, fig. 3.
? *Globiocephalus affinis*, Gray, Zool. Erebus & Terror, 1846, p. 32.
Globiocephalus Edwardsii, A. Smith, African Zoology.
Globiocephalus incrassatus, Gray, Proc. Zool. Soc. London, 1861, p. 309, 1 fig.
Sphærocephalus incrassatus, Gray, Proc. Zool. Soc. London, 1864, p. 244; Catalogue, 1866, p. 324.

Traill's concise description and generally accurate figure leave no doubt whatever as to the identity of his *Delphinus melas*. Gray was surely at fault in employing Lacépède's name, *Catodon Svineval*, since the only part of the latter's description which is diagnostic in no way applies to the blackfish.

The generally accepted opinion that the blackfish of the northeastern coast of North America, the *Delphinus intermedius* of Harlan, is identical with the *Globicephalus melas* of European waters, seems to rest upon an excellent basis. Harlan's species was described from a specimen from

Salem, Mass. There are in the Museum collections some six or eight skulls, three skeletons, and two casts of specimens from Cape Cod, Massachusetts, and also some ten photographs of different schools which have stranded from time to time near Provincetown, at the extremity of the Cape. In external appearance the specimens photographed correspond to Harlan's description and very crude figure, and on the other hand they correspond exactly to the individuals from European waters figured by Murie, Couch, and Cuvier. All the individuals of which the under surface of the body is shown in the photographs (some twenty or more), without exception, have the peculiar white mark on the throat and median line of the belly, represented in Cuvier's figure. Harlan's statement, that the length of the dorsal fin is only one-thirteenth of the total length, seems to be based on a measurement of the figure, which is certainly incorrect as regards the dorsal. In the skeleton the vertebral formula is the same as that given by Flower for *G. melas*.* In two complete skeletons the formula is as follows: No. 14417: C. 7, D. 11, L. 14, Ca. 27=59. No. 20958: C. 7, D. 11, L. 13, Ca. 29=60.

The teeth in six skulls are as follows: $\frac{9-9}{?-?}$ $\frac{?-?}{10-10}$ $\frac{10-9}{?-?}$ $\frac{?-11}{?-?}$ $\frac{9-9}{9-9}$ $\frac{10-10}{10-10}$.

The number $\frac{9}{9}$ to $\frac{10}{10}$ would therefore appear to be the average, which s also the number commonly found in European specimens. A skull from Cape Cod presents the following proportions as compared with the specimen from Paimpol, of which measurements are given by Fischer, p. 188:

Measurements.	Skull from Cape Cod.	Specimen from Paimpol.
Total length	61.0	61.0
Extremity of beak to anterior margin superior nares	42.3	41.0
Extremity of beak to maxillary notches	34.1	32.0
Breadth of cranium between post-orbital processes of frontal	43.0	43.0
Breadth of beak at base	23.6	24.0
Breadth of beak at middle	18.0	19.0

Measurements of other specimens from Cape Cod will be found in the table on p. 136.

There seems to be on the whole no good reason for considering the blackfish of New England as specifically distinct from that of European waters.

Globicephalus affinis Gray.

This species is founded on a single skull, No. 2999, in the College of Surgeons. The locality from whence it was derived is unknown. The skull, which is 62.5^{cm} long and has the teeth $\frac{11-11}{12-12}$, seems to differ from the ordinary *G. melas* simply in having the intermaxillæ somewhat

* P. Z. S., 1883, p. 508.

broader than is common in that species and in being a little narrower across the orbits. It is doubtful whether these differences entitle it to rank as a distinct species. The proportions of the skull are given in the table on p. 136.

Phocæna Edwardsii A. Smith.

Sir Andrew Smith described this species from a drawing and description of E. Verreaux.* The description is partially made up of generic characters, and is also in part contradictory. For example, the sides are said to be black in one sentence, and in the next, white. The teeth are stated to be $\frac{12-12}{12-12}$, the entire length of the body 12½ feet, the circumference in front of the dorsal 6¾ feet, and the breadth of the flukes 2⅔ feet. The breadth of the flukes, according to these measurements, equals 21.9 per cent. of the total length. In D. Murie's specimen† the same breadth is 20.8 per cent. of the total length, and in the Paimpol specimen cited by Fischer (l. c., p. 187) 22.4 per cent. Since Smith's specimen is intermediate between the other two, and the percentage of the breadth of the flukes to the total length is intermediate between the percentages furnished by the other two specimens, it is evident that this measurement, which is practically the only tangible character given, is of no significance as distinguishing the supposed species from *G. melas*.

Furthermore, M. Fischer has shown (l. c., p. 193) that a blackfish identical with the *G. melas* of European waters occurs about the Cape of Good Hope, and finally Gray, who had Verreaux's original drawing, states that "it is very like *Globiocephalus Svineval* of the European seas" (*Catalogue*, p. 325). M. Fischer is therefore perfectly justified in his assertion:

> Il est donc probable que le *G. melas* se montre sur toute la côte ouest d'Afrique jusqu'au Cap, et que le nom de *G. Edwardsi* doit passer en synonymie.‡

The Globicephalus of New Zealand waters.

In his *Notes on New Zealand Whales*, in Vol. VII of the Transactions of the New Zealand Institute, p. 261, Dr. Hector describes, under the name of *G. macrorhynchus*, Gray, the blackfish common of New Zealand seas. But it is evident from the description and figures (l. c., Pl. XVI, figs. 3 and 3*a*) that this is not *G. macrorhynchus*, but rather a species closely resembling, or identical with, *G. melas*. Professor Flower, who has examined skeletons of the New Zealand form, finds nothing whereby to distinguish it from *G. melas* (*Characters and Divisions*, p. 509).

Sphærocephalus incrassatus Gray.

There is apparently no reason to doubt the generally accepted opinion that this species, founded on a water-worn skull, is identical with *G. melas*.

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* African Zoology. † Trans. Zool. Soc. London, VIII, pp. 240, 241. ‡ L. c., p. 194.

Globicephalus propinquus Malm.

This species was founded on a fœtus 315mm long, which had been in alcohol twenty-one years at the time it was described by Malm.* That writer states that it is distinguished from *G. melas* by the possession of a slightly greater number of vertebræ and phalanges. The number given in each case, however, is within the limit of variation of *G. melas*, and no importance, therefore, attaches to these supposed characters.

Furthermore, the present writer is of the opinion that the classifier is under no obligation to seriously consider species founded upon fœtal specimens.

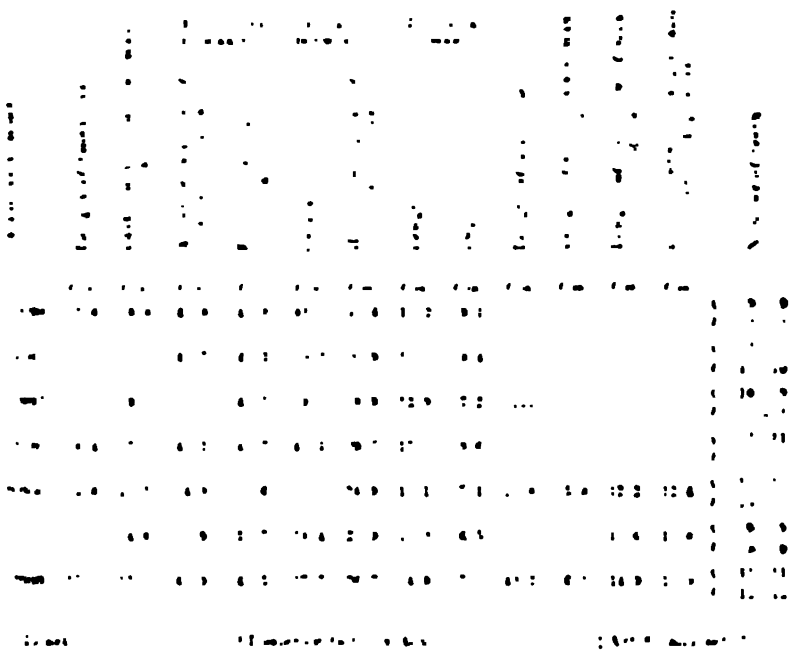
The remarks of Commander Natt och Dag upon the adult from which the fœtus in question was taken are based merely on his remembrance of the appearance of the specimen and are of no value in identifying the species.

Table of measurements.

GLOBICEPHALUS MELAS.

Catalogue number.	Collection.	Type of—	Locality.	Sex and age.	Total length.	Length of beak.	Breadth of beak—		Breadth of intermaxillæ at middle of beak.	Greatest breadth between outer margins of intermaxillæ proximally.
							At base of maxillary notches.	At its middle.		
					Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*
12998	U. S. Nat. Mus.	.....	Cape Cod	Ad.	62.6	31.8	*23.5	17.8	15.7	14.5
14361	...do	.....	....do	Ad?	61.8	30.9	*23.7	18.3	15.5	15.5
12097	...do	.....	....do	Ad.	62.4	31.3	*23.0	17.6	15.4	15.8
12100	....do	.....	...do	Ad.	65.5	33.4	*24.0	19.4	15.4	16.3
20950	...do	.....	....do	Jr.	54.1	25.5	18.3	13.8	11.9	13.7
20957	...do	.....	....do	Jr.	49.4	23.1	16.1	11.3	10.4	12.5
2999	Roy. Coll. Surg.	*G. affinis*	.....	....	62.5	31.8	23.1	19.1	15.5	14.7

* K. Svenska Vetens. Akad. Handl., ny följd, IX, i, 1871, Art. 2, p. 85.



We pass now from the species which have a whitish band along the [illegible] to those which are entirely black. In three instances (*G. semimelanoleuca*, *G. melanoleuca*, and *G. melanoleuca typiforma*) Coquet has been shown that [illegible] had the intermaxillæ expanded distally so as to cover the anterior half of the beak. Two other nominal species (*G. melanoleuca leucogaster* and *G. melanoleuca pectoralis leucogaster*) are known only from [illegible] but as these have the premaxillæ expanded we may presume that the females from which they were derived were also entirely [illegible].

[illegible]

[illegible] Proc. Zool. Soc. Lond. 1921, p. [illegible].

The species are easily known from the account in Vol. xxviii of the Journal of the Asiatic Society of Bengal. The color is stated to be [illegible], and they pair underneath. The intermaxillæ are expanded. The dorsal and lateral vertebræ taken together number [illegible] in *G. leucogaster*, terms and one less than in *G. melanoleuca*, the number of terms.

The [illegible] of the [illegible] are [illegible] and do not in [illegible].

[illegible] the type specimens in the Calcutta Museum have been more [illegible] and it will be necessary to [illegible] the variety of this [illegible].

GLOBICEPHALUS MACRORHYNCHUS Gray.

Globiocephalus macrorhynchus, Gray, Zool. Erebus and Terror, 1846, p. 33; Cat. Seals and Whales, 1866, p. 320.

This species is founded on a single skull, No. 3000, in the Royal College of Surgeons, London, to which institution it was presented by F. D. Bennett. The locality from which it was derived is unknown.

I regret to find that I made no notes upon this skull and have only my measurements for comparison. As the skull is a youngish one I do not trust myself to draw any conclusions from the consideration of the measurements alone.

In his paper on the *Delphinidæ*, Professor Flower is inclined to believe, though with some hesitation, that the blackfish skulls with broad intermaxillæ all belong to the same species. I have since satisfied myself, however, that two forms, *G. brachypterus* Cope and *G. scammoni* Cope are perfectly distinct, and the question now arises whether either of these species is identical with *G. macrorhynchus*. As I neglected to take notes upon the type-skull, I am, unfortunately, unable to throw any light on this question. The measurements which I took are subjoined:

Table of measurements.

GLOBICEPHALUS MACRORHYNCHUS.

Catalogue number.	Collection.	Type of—	Locality.	Sex and age.	Total length.	Length of beak.	Breadth of beak— At base of maxillary notches.	Breadth of beak— At its middle.	Breadth of intermaxillæ at middle of beak.	Greatest breadth between outer margins of intermaxillæ proximally.
					Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm*	*Cm.*
3000	Roy. Coll. Surg.	*G. macrorhynchus.*	South Seas.....	Jr.	58.5	30.5	24.9	20.6	19.8	*16.0

Catalogue number.	Length of tooth-line.	Extremity of beak to— Last tooth to base of maxillary notch.	Extremity of beak to— Anterior margin of superior nares.	Extremity of beak to— End of crest of pterygoid.	Breadth between— Orbits.	Breadth between— Hinder margins of temporal fossæ.	Temporal fossæ. Length.	Temporal fossæ. Depth.	Length of mandible.	Length of symphysis of mandible.	Length of tooth-row of mandible.	Depth between angle and coronoid process of.	Number of teeth.
	Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	
3000	10.4†	19.8	40.0	41.9	41.8	26.2	14.2	10.7	49.6	6.9	13.5	14.7	$\begin{matrix}6-6 & 7-7\\ 8-8 & 8-8\end{matrix}$ or

* Posterior to the notch. † Actual length; not from end of beak.

GLOBICEPHALUS SCAMMONI Cope.

Globicephalus Scammoni, Cope, Proc. Acad. Nat. Sci. Phila., 1865, p. 71.

This species was made known by Professor Cope from the description, measurements, and drawings of Scammon.

There is in the museum collection a skull presented by Scammon which is presumably the type of the species. This skull I have compared with those of *G. brachypterus*, and I, as already stated, have reached the conclusion that the differences observable in the two specimens are the distinctions between the blackfish of the east and west coasts.

Scammon's measurements of the exterior also differ from those obtained from specimens from the east coast. These differences will be pointed out when treating of *G. brachypterus*.

GLOBICEPHALUS BRACHYPTERUS Cope.

Globicephalus rosmarus, Cope, Proc. Acad. Nat. Sci. Phila., 1865, p. [illegible].
Globicephalus brachypterus, Cope, Proc. Acad. Nat. Sci. Phila., 1876, p. 129.

As early as 1865 Professor Cope entertained the opinion that two distinct species of blackfish occurred on the east coast of the United States, and in 1876 he was enabled to demonstrate the validity of his opinion by the acquisition of a complete female specimen from Delaware Bay. This specimen, with the skull formerly referred to as "Globicephalus? n. sp.," became the basis of his *Globicephalus brachypterus*.

Recently, as already stated on a previous page, the Smithsonian Institution has received three skeletons and an additional skull, which in the opinion of the writer may undoubtedly be referred to the species under consideration. Two of these skeletons and the extra skull were obtained by Mr. Joseph Wilcox in Osprey, Fla., and the third skeleton came from the U. S. Life Saving station at Dam Neck Mills, near Cape Henry, Virginia. The Florida skeletons were respectively about 13 and 14 feet long, and the Virginia specimen (a male) measured 15 feet 3 inches in the flesh. The following external measurements were taken from the Virginia specimen while fresh, by Mr. F. W. Sconick:

Measurements of blackfish (*Globicephalus brachypterus*), male, from Dam Neck Mills, Virginia.

	Ft.	In.
[illegible]	15	3
[illegible]	1	[illegible]
[illegible]	1	[illegible]
[illegible]	1	
[illegible]	1	11½
[illegible]	1	2
[illegible]	0	2
[illegible]	2	4
[illegible]		10
[illegible]	2	7
[illegible]	1	2

	Ft.	In.
Flukes from tip to tip	3	10
Length of mouth	1	3½
Length of eye		1½
Length of caudal ridge extending upward from notch of flukes	4	4
Vertical height		3
Greatest width of caudal region at a distance of 3 feet 1 inch from notch of flukes	2	3

The vertebral formula in this specimen and in the 18-foot skeleton from Florida is as follows:

Male. Dam Neck Mills, Va. C. 7; D. 11; L. 11; Ca. 28 = 57.
Sex? Osprey, Fla. C. 7; D. 10; L. 12; Ca. 26 (?+2) = 55 or 57.

Measurements of the skulls of all the specimens will be found in the table on page 142.

The color in every case was entirely black, and the premaxillæ cover the maxillæ in the distal half of the beak.

On comparing the skulls of these specimens with that of *G. scammoni* (No. 9074) numerous differences were found which made it apparent that *G. brachypterus* and *G. scammoni* could not be regarded as specifically identical. In *G. brachypterus* the intermaxillæ project beyond the free margin of the maxillæ, which margin is quite deeply grooved. In *G. scammoni*, on the contrary, the intermaxillæ do not extend quite to the margin of the maxillæ. This difference in the disposition of parts can not be regarded as an age character, since the skull of *G. scammoni* is the older.

In *G. scammoni*, again, the greatest enlargement of the intermaxillæ occurs at the junction of the proximal and second fourths of the distance from the maxillary notch to the extremity of the beak, while in *G. brachypterus* the length from the maxillary notch to the point of greatest enlargement of the premaxillæ is contained only about two and a half times in the length of the beak.

The rugosities near the distal extremity of the premaxillæ are very strongly marked in the skull of *G. scammoni*, but only slightly in any of the skulls of *G. brachypterus*. As the largest skull of the latter species is certainly from an adult animal it is improbable that this difference is entirely due to age.

In both the older and younger skulls of *G. brachypterus* the nasal septum is ossified so as to stand above the plane of the adjacent intermaxillæ, which is not the case in *G. scammoni*.

The skulls of *G. brachypterus* are also distinguished from that of *G. scammoni* in having the beak longer and narrower, the blowhole narrower and placed further back, the width at the orbits greater and the temporal fossæ considerably larger.

The external characters considered by Professor Cope to be diagnostic of *G. brachypterus* are (1) the length of the pectoral fin, and (2) the anterior position of the dorsal fin.

As regards the length of the pectoral fin, I find by comparing the

measurements of the type specimen and the Dean Sage Mills specimen of *G. brachypterus* with those given by Scammon for *G. scammoni* Marine Mammals, p. 80), that the pectoral fin was relatively shorter in the two former individuals than in Scammon's specimen. In the latter the length of the pectoral fin is 18.5 per cent the total length, while in the type of *G. brachypterus* it is 16.4 per cent., and in the Virginia specimen of the same species, 16.9 per cent.

The distance from the extremity of the head to the anterior base of the dorsal fin in the type of *G. brachypterus* as given by Professor Cope, is relatively less than in any other of which I have examined the record. It equals 24.6 per cent. of the total length. In the Virginia specimen the distance to the dorsal is 25.9 per cent. of the total length; in *G. scammoni* it is 29.0 per cent. Here again, therefore, the two specimens of *G. brachypterus* agree with one another and contrast with *G. scammoni*, the dorsal fin being nearer the head in the two former specimens than in the latter.

In the position of the flippers we find the same relationship retained. The flippers are broader relatively in both specimens of *G. brachypterus* than in *G. scammoni*. In the latter they equal 22.6 per cent. of the total length, in the type of *G. brachypterus* 24.1 per cent., and in the Virginia specimen of the same species, 25.6 per cent.

Though I am convinced that there is very considerable variation in the proportions of parts in individuals of the same species, I nevertheless think that the differences shown in the percentages given above, may be taken as a supplement to the differences observable in the skull, to which I have referred, separating the east coast form from the west coast black fish.

No specimens of *G. brachypterus*, so far as I am aware, have been taken north of Delaware Bay, while on the other hand there are no records to show that *G. scammoni* ranges farther south than Long Island, New York. The southern limit of the range of *G. brachypterus* is not determinable at present. It is probable that the species is found throughout the Gulf of Mexico and also the West Indies, if we may refer to it a specimen in the Paris Museum from Guadaloupe Island, and which is the case of

Globicephalus sieboldii Gray.

This skull is figured in the *Zoology of Japan*, pl. 32, fig. 3, under the name of *G. intermedius*. It is true, however, to judge by the figure, that the skull which *G. sieboldii* represents is not the same as that of the type of *G. intermedius* Owen, as will be noted, under the head of the type of the latter species. *G. sieboldii* Gray, Cat. Seals and Whales, 1866, p. 81. He, however, gave no description of it, but merely referred to the figure.

Measurements of four skulls of Globicephalus brachypterus and one skull of G. scammoni (probably the type).

Measurements.	G. brachypterus.				G. scammoni.
	Dam Neck Milla. ♂ 22561.	Osprey, Fla. 22571.	22570.	22572.	9074.
	Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*
Total length	66.2	61.2	68.6	69.0	69.0
Length of the beak	33.3	31.6	34.0	35.3	31.0
Width of beak at its base	28.8	26.2	31.5	31.7	30.8
Width of beak at its center	23.5	23.1	24.0	26.9	25.2
Width of intermaxillæ at same point	22.9	23.0	24.0	27.4	23.6
Extremity of beak to blowhole	46.0	41.5	48.1	47.7	44.8
Extremity of beak to pterygoid	43.2	42.2	46.4	47.9	45.5
Length of tooth line	18.3	15.1	17.4	18.3	20.2
Width of skull at the orbits	45.0	42.2	49.0	50.2	48.7
Width of blowhole	9.0	8.5	10.0	9.6	10.8
Length of temporal fossa	16.3	14.6	17.2	19.0	14.8
Depth of temporal fossa	10.2	9.7	11.0	12.3	9.0
Number of teeth	7–8	8–8	9–8	8–8 8–8	8–8

GLOBICEPHALUS SIEBOLDII Gray.

Delphinus globiceps, Schlegel, Fauna Japon., Mammalia, 1844 (?), p. 17, p. 27, figs. 1–4.

Globiocephalus Sieboldii, Gray, Zool. Erebus and Terror, 1846, p. 32.

I should be inclined to pass over this species as founded upon too young a specimen to be seriously considered, were it not that in Schlegel's figure of the exterior at least one peculiar character is indicated. This character relates to the shape of the pectoral fin. In other species the pectoral fins come gradually to an acute termination, but in Schlegel's animal they are represented as being fully one-half as broad immediately behind the extremity as across the middle. This gives the fins an entirely different appearance from those of the other species. If the figure is correct, and if the character proves constant, Schlegel's specimen must be regarded as belonging to a distinct species. The animal was so young that the characters of the skull are not of great importance. The extremity of the vomer has the appearance of being bifurcated, one-half being applied to the wall of either intermaxillary bone. This disposition of parts is found in the species of some genera, but not in other species of *Globicephalus*.

Resting upon so insufficient a basis, the species must be looked upon as of doubtful value, until more specimens from the waters of Japan have been acquired and studied. It will very probably prove to be identical with *G. scammoni*, to which its uniformly black coloration and expanded intermaxillæ show it to be allied.

Globiocephalus australis and sibo, Gray.

Globiocephalus australis is merely a name inserted by Gray in the Supplement to the Catalogue of Seals and Whales (p. 85). It was never described.

Orcinus orca, which appears in the same work (l. c.), is a name attached by Gray to an unrecognizable cetacean, stated by Schlegel in the *Fauna Japonica* to be considered by Japanese writers a variety of the blackfish. It should be expunged.

16. PSEUDORCA Reinhardt.

Pseudorca Reinhardt, K. Dansk. Vidensk. Selsk. Skr. (5), viii. 1867, p. 171.

This genus is sufficiently well distinguished from *Orca*, its nearest ally, by its small dorsal fin, pointed pectorals, short alveoli, closely approximated pterygoids and other characters, pointed out by Reinhardt and Professor Flower, to merit a separate generic appellation.

PSEUDORCA CRASSIDENS Owen.

Phocæna crassidens, Owen, Brit. Foss. Mamm. and Birds, 1846, p. 536.

Orca crassidens, Gray, Zool. Voy. Sulph. & Lizard, 1850, p. 81; Catalogue of Cetacea, 1850, p. 64.

Pseudorca crassidens, Reinhardt, K. Dansk. Vidensk. Selsk. Skr. (5), viii. 1867, p. 171.

Orca crassidens, Flower, Zool. Soc. Lond., 1868, p. 451.

Orca crassidens, Flower, Proc. Acad. Nat. Sci. Philad., 1869, p. 203.

Orcinus crassidens, Burmeister, Anales Mus. Publ. Buenos Aires, i. 1869–80, p. 61, pl. xxi.

According to Professor Flower, the subfossil specimen which formed the type of this species, from the Lincolnshire fens, is lost.* We have, therefore, only Sir Richard Owen's description and figures to guide us in identifying other specimens with the type. An examination of these leaves little room for doubt that Reinhardt's specimens were specifically identical with Sir Richard Owen's type. Professor Flower has also recently stated his opinion that the form previously described by him under the name of *Orca* is identical with that described by Reinhardt. The former writer has had greater opportunities than myself for the comparison of specimens of these species, but my own more limited studies lead me to concur in his opinion regarding the specific identity of all the specimens of the genus here referred.

Of four skulls in the Royal College of Surgeons, Nos. [illegible], [illegible], [illegible], [illegible], [illegible], [illegible], [illegible], No. [illegible], which is the largest, is much the broadest, having a rather flat broad snout and a strong ridge almost the whole length of the maxillaries. The maxillaries are similarly broad at the base and somewhat flattened. The zygomatic processes are stronger in No. [illegible], the next largest specimen, but in the other skulls they are more slender. The strength of the ridge forming the posterior margin of the temporal fossæ increases gradually from the smallest skull, No. [illegible], to the largest specimen, No. [illegible], in which it is developed to a very great extent, so that the distance between the margins of the fossæ is considerably greater in the posterior than in the anterior part. The occipital [illegible]

* [illegible] p. [illegible].

vertebrarterial canal is likewise an individual character. The variation of one in the number of pairs of ribs is not considered of specific importance. The shortness of the muzzle in *rhinodon* is doubtless due to the immaturity of the specimen. The amount of expansion of the vomer and palatines in the median line is a character which varies greatly with age. The question of the number of teeth presents some difficulties. I have never seen a white whale skull with so few as four or six teeth. The number in twelve skulls in the Museum varies from eight to eleven.

As regards the relative positions of the anterior extremity of the exposed prenareal portion of the maxilla and the maxillary notch it may be said that in the twelve skulls mentioned above this part of the maxilla appears at different points from almost exactly opposite the notch to a point about midway between the line of the notches and the superior nares.

On the whole I am inclined to reunite all of Professor Cope's species under the original name and to hold that in the Arctic seas, at least, but one species of white whale has been discovered.

As regards Gray's *D. Kingii*, reported to have come from New Holland, it can only be said that considering that no white whale has been observed in the South seas, and that the type skull agrees with others from northern waters, there is strong probability that the locality given by Gray is erroneous. There is a skull in the national collection from Pastolik, Alaska, near the mouth of the Yukon, which agrees almost exactly with the type of *D. Kingii*. In both the length of the beak is about 40 per cent. of that of the skull, the breadth at the notch is a third of the total length, and the breadth of the intermaxillæ at the middle of the beak equals the distance from the last tooth to the maxillary notch.

Of Desmarest's *Delphinus canadensis*, founded on Duhamel's *Marsouin blanc*, little need be said. Duhamel states that he never has himself seen this animal nor any of the other porpoises which he figures. His words are:

Enfin on m'a envoyé de Canada, sous le nom de *Marsouin blanc*, de douze pieds de longueur, le dessein (fig. 4), qui avait le museau très petit et le front fort élevé.*

In the explanation of the plates he says:

Celui, fig. 4, est nommé *Marsouin blanc*, à cause de la couleur de sa peau; il a le front très-gros.†

All of Duhamel's figures of porpoises are very incorrect, and his representation of the white whale resembles that animal perhaps as much as those of the killer and the bottle-nose resemble those species. It is unwise to give such obviously inaccurate figures serious consideration, and it is certain that in the light of present knowledge, Desmarest would not have erected a species on the *Marsouin blanc*.

* Duhamel, Traité des Pesches, vol. iv, pt. 2, sect. x, Chap. ii, 1782, p. 41 (Pl. x, fig. 4).

† L. c., p. 64.

and in the smaller number of teeth; the premaxillary bones are relatively narrower throughout the greater part of their length.[20] As regards the breadth of the beak anteriorly, it should be stated that the skull of *P. meridionalis* described prior to the date of Professor Cope's writing were young, while the beak under consideration is from an old individual, as is shown by the partial anchylosis of the premaxillæ with the maxillæ, and the worn condition of the teeth. The teeth in this specimen are $\frac{23}{24}$ and exposed, therefore, the number in one of the specimens of *P. meridionalis* No. 2384 in the Royal College of Surgeons, is stated the number to $\frac{22}{23}$. As regards the posterior teeth "being the last of the maximaries, instead of the mandibulars, as in *meridionalis*," I do not think any cetologist would insist upon this as a specific character. The last maxillary tooth was evidently the farthest back in the skull from the northeast coast in the National Museum, and is so in the skull figured by Van Beneden and Gervais (*Ost. foss.*, Pl. 1, figs. 8 and 8a). I can not regard the specimen as other than *P. crassidens*. The proportions of the mandible and beak are as follows:

Measurements of No. 2384 Royal College of Surgeons.

	Inches.
Greatest length (straight line)	20.75
Least distance between the rami	3.0
Least distance between the orbits	9.0
Least distance between the coronoid processes	6.1
Least distance between the alveoli of teeth counting from posterior end of row	2.5
Least distance between the same points	3.6
Length of symphysis	8.4

Of Phocoena dalli True Burmeister.

Gervais and P. Gervais[21] have already expressed their belief in the identity of this species with *P. crassidens*, and there is apparently no reason for dissent from their opinion. It has one tooth more above on each side than *crassidens*, and all the teeth are very much worn, though the skull is from a young animal from No. 10130 in the national collection by Dr. Stejneger to the skull of an adult. In the characters pointed out by Burmeister in his description of the skull, it agrees with the specimens of *P. crassidens* which I have examined.

Phocoena meridionalis Cuvier.

Professor Gervais[22] has in the *Zoologischer Anzeiger* (v, 1882, p. [illegible]) under the name above referred to the Mediterranean

He gives, however, no characters by which the species can be [illegible]. The teeth are [illegible]. The greatest length of the skull in the British Museum is [illegible] long, the greatest breadth [illegible].

[illegible]

[illegible]

[illegible]

SYNOPSIS OF THE SPECIES OF DOLPHINS.

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I. ARTIFICIAL KEY TO THE GENERA BASED ON EXTERNAL CHARACTERS.

Head with a beak which is usually distinctly marked off from the forehead by a groove or constriction

Dorsal fin absent ..... 1 *Inia*

Dorsal fin present, triangular or ovate

Beak not distinctly marked off from the forehead ..... 2 *Platanista*

Dorsal fin present, falcate

Beak distinct, short and stumpy ..... 3 *Lipotes*

Beak distinct, elongated

Teeth of one kind only

Crowns of teeth pointed ..... 4 *Steno*

Crowns of teeth spatulate ..... 5 *Sotalia*

Teeth of two kinds

Anterior teeth in each lateral half of upper jaw ..... 6 *Tursiops*

Anterior teeth in each lateral half of upper jaw ..... 7 *Delphinus*

Head with a beak or with merely an obtuse ridge marking the upper jaw

Teeth of upper jaw directed forwards

Dorsal fin absent ..... 11 *Neomeris*

Dorsal fin present, triangular or falcate ..... 12 *Phocæna*

Teeth in upper and lower jaws directed outwards

Teeth in upper jaw distinct from, and much fewer in number than, those in the lower jaw ..... 13 *Grampus*

Teeth present in both jaws

Dorsal fin of moderate or large size, falcate

Teeth few and large, those in middle of jaws much larger than the others ..... 14 *Orca*

Teeth numerous, small, of nearly equal size throughout ..... 15 *Pseudorca*

Dorsal fin small or moderate, falcate

Teeth few and large, those in middle of jaws much larger than the others ..... 16 *Feresa*

Teeth numerous, small, of nearly equal size throughout ..... 17 *Lagenorhynchus*

Teeth absent from middle of upper jaw ..... 18 *Cephalorhynchus*

Dorsal fin small or represented by a low ridge ..... 19 *Kogia*

Teeth small, numerous, and confined to the front part of the jaws, which are produced into a long beak ..... 20 *Inia*

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* Known only from skull.

Table of measurements—Continued.

Catalogue number.	Length of tooth-line.	Last tooth to base of maxillary notch.	Extremity of beak to—		Breadth between—		Temporal fossæ.		Length of mandible.	Length of symphysis of mandible.	Length of tooth-row of mandible.	Depth between angle and coronoid process.	Number of teeth.
			Anterior margin of superior nares.	End of crest of pterygoid.	Orbits.	Hinder margins of temporal fossæ.	Length.	Depth.					
	Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	
12098	15.6	18.8	42.8	41.0	40.0	31.4	12.2	9.1	.....	.....	.....	.....	9—9 / ?—?
14361	....	.....	41.7	42.3	39.2	26.9	15.1	9.4	.....	.....	.....	.....	?—? / 10—10
12097	15.1	19.2	.....	42.5	39.3	28.9	12.9	7.2	.....	.....	.....	.....	10—9 / ?—?
12100	18.4	17.2	45.3	45.7	42.3	29.7	17.3	9.6	.....	.....	.....	.....	?—11 / ?—?
20950	13.8	13.5	34.9	35.6	32.3	24.9	12.1	7.1	21.8	5.8	12.2	12.4	10—10‡ / 10—10
20957	11.5	14.0	31.9	31.7	28.4	23.9	12.0	6.5	.....	.....	10.6	10.8	9—9‡ / 9—9
2999	17.0	15.5	41.9	42.5	37.7	26.7	14.0	7.2	40.3	6.1	14.9	13.9	11—11 / 12—12

* Least. † Posterior to the notch. ‡ Artificially set (?).

We pass now from the species which have a whitish band along the belly to those which are entirely black. In three instances (*G. scammoni* Cope, *indicus* Blyth, and *brachypterus* Cope) it has been shown that individuals entirely black had the intermaxillæ expanded distally so as to cover the anterior half of the beak. Two other nominal species (*G. macrorhynchus* Gray and *G. guadaloupensis* Gray) are known only from skulls, but as these have the premaxillæ expanded we may presume that the individuals from which they were derived were also entirely black.

GLOBICEPHALUS INDICUS Blyth.

Globicephalus indicus, Blyth, Journ. Asiat. Soc. Bengal, XXI, p. 358. (*Fide* Blyth); Journ. Asiat. Soc. Bengal, XXVIII, 1859, p. 490.

This species is only known to me from the account in Vol. XXVIII of the Journal of the Asiatic Society of Bengal. The color is stated to be "uniform leaden-black, slightly paler underneath." The intermaxillæ are expanded. The dorsal and lumbar vertebræ taken together number one more than is usual in *G. brachypterus* and one less than in *G. melas*, but this is a character of no value.

The measurements of the exterior are few in number and do not indicate specific distinctness.

Until the type-skeletons in the Calcutta Museum have been more fully described it will be impossible to determine the validity of this species.

GLOBICEPHALUS MACRORHYNCHUS Gray.

Globiocephalus macrorhynchus, Gray, Zool. Erebus and Terror, 1846, p. 33; Cat. Seals and Whales, 1866, p. 320.

This species is founded on a single skull, No. 3000, in the Royal College of Surgeons, London, to which institution it was presented by F. D. Bennett. The locality from which it was derived is unknown.

I regret to find that I made no notes upon this skull and have only my measurements for comparison. As the skull is a youngish one I do not trust myself to draw any conclusions from the consideration of the measurements alone.

In his paper on the *Delphinidæ*, Professor Flower is inclined to believe, though with some hesitation, that the blackfish skulls with broad intermaxillæ all belong to the same species. I have since satisfied myself, however, that two forms, *G. brachypterus* Cope and *G. scammoni* Cope are perfectly distinct, and the question now arises whether either of these species is identical with *G. macrorhynchus*. As I neglected to take notes upon the type-skull, I am, unfortunately, unable to throw any light on this question. The measurements which I took are subjoined:

Table of measurements.

GLOBICEPHALUS MACRORHYNCHUS.

Catalogue number.	Collection.	Type of—	Locality.	Sex and age.	Total length.	Length of beak.	Breadth of beak— At base of maxillary notches.	Breadth of beak— At its middle.	Breadth of intermaxillæ at middle of beak.	Greatest breadth between outer margins of intermaxillæ proximally.
					Cm.	Cm.	Cm.	Cm.	Cm	Cm.
3000	Roy. Coll. Surg.	*G. macrorhynchus.*	South Seas.....	Jr.	58.5	30.5	24.9	20.6	19.8	*16.0

Catalogue number.	Length of tooth-line.	Last tooth to base of maxillary notch.	Extremity of beak to— Anterior margin of superior nares.	Extremity of beak to— End of crest of pterygoid.	Breadth between— Orbits.	Breadth between— Hinder margins of temporal fossæ.	Temporal fossæ. Length.	Temporal fossæ. Depth.	Length of mandible.	Length of symphysis of mandible.	Length of tooth-row of mandible.	Depth between angle and coronoid process of.	Number of teeth.
	Cm.	Cm.	Cm.	Cm.	Cm.	Cm.	Cm.	Cm.	Cm.	Cm.	Cm.	Cm.	
3000	†10.4	19.8	40.0	41.9	41.8	26.2	14.2	10.7	49.6	6.9	13.5	14.7	$\left\{\begin{matrix}6-6\\8-8\end{matrix}\right.$ or $\left\{\begin{matrix}7-7\\8-8\end{matrix}\right.$

* Posterior to the notch. † Actual length; not from end of beak.

GLOBICEPHALUS SCAMMONI Cope.

Globiocephalus Scammoni, Cope, Proc. Acad. Nat. Sci. Phila., 1869, p. 21.

This species was made known by Professor Cope from the description, measurements, and drawings of Scammon.

There is in the national collection a skull presented by Scammon which is presumably the type of the species. This skull I have compared with those of *G. brachypterus*, and, as already stated, have reached the conclusion that the differences observable indicate specific distinctions between the blackfish of the east and west coasts.

Scammon's measurements of the exterior also differ from those obtained from specimens from the east coast. These differences will be pointed out when treating of *G. brachyypterus*.

GLOBICEPHALUS BRACHYPTERUS Cope.

G. ? sp. nov., Cope, Proc. Acad. Nat. Sci. Phila. 1866, p. 8.
Globiocephalus brachypterus, Cope, Proc. Acad. Nat. Sci. Phila., 1876, p. 129.

As early as 1866 Professor Cope entertained the opinion that two distinct species of blackfish occurred on the east coast of the United States, and in 1876 he was enabled to demonstrate the validity of his opinion by the acquisition of a complete female specimen from Delaware Bay. This specimen, with the skull formerly referred to as "Globiocephalus ? n. sp.," became the basis of his *Globiocephalus brachypterus*.

Recently, as already stated on a previous page, the Smithsonian Institution has received three skeletons and an additional skull, which in the opinion of the writer may undoubtedly be referred to the species under consideration. Two of these skeletons and the extra skull were obtained by Mr. Joseph Willcox in Osprey, Fla., and the third skeleton came from the U. S. Life-Saving station at Dam Neck Mills, near Cape Henry, Virginia. The Florida skeletons were respectively about 17 and 18 feet long, and the Virginia specimen (a male) measured 15 feet 3 inches in the flesh. The following external measurements were taken from the Virginia specimen while fresh, by Mr. T. W. Scollick:

Measurements of blackfish, G. brachypterus, No. 22561, male, from Dam Neck Mills, Virginia.

	Ft.	In.
Tip of snout to notch of flukes	15	3
Tip of snout to blowhole	1	9½
Tip of snout to eye	1	9½
Tip of snout to anterior base of pectoral	3	
Tip of snout to anterior base of dorsal	3	11½
Tip of snout to anus	10	5
Tip of snout to penis	9	2
Length of pectoral, straight, from middle of base to tip	2	6
Greatest breadth of pectoral		10
Length of base of dorsal	2	7
Vertical height of dorsal	1	2

	Ft.	In.
Flukes from tip to tip	3	10
Length of mouth	1	3½
Length of eye		1½
Length of caudal ridge extending upward from notch of flukes	4	4
Vertical height		3
Greatest width of caudal region at a distance of 3 feet 1 inch from notch of flukes	2	3

The vertebral formula in this specimen and in the 18-foot skeleton from Florida is as follows:

Male. Dam Neck Mills, Va. C. 7; D. 11; L. 11; Ca. 28 = 57.
Sex ? Osprey, Fla. C. 7; D. 10; L. 12; Ca. 26 (?+2) = 55 or 57.

Measurements of the skulls of all the specimens will be found in the table on page 142.

The color in every case was entirely black, and the premaxillæ cover the maxillæ in the distal half of the beak.

On comparing the skulls of these specimens with that of *G. scammoni* (No. 9074) numerous differences were found which made it apparent that *G. brachypterus* and *G. scammoni* could not be regarded as specifically identical. In *G. brachypterus* the intermaxillæ project beyond the free margin of the maxillæ, which margin is quite deeply grooved. In *G. scammoni*, on the contrary, the intermaxillæ do not extend quite to the margin of the maxillæ. This difference in the disposition of parts can not be regarded as an age character, since the skull of *G. scammoni* is the older.

In *G. scammoni*, again, the greatest enlargement of the intermaxillæ occurs at the junction of the proximal and second fourths of the distance from the maxillary notch to the extremity of the beak, while in *G. brachypterus* the length from the maxillary notch to the point of greatest enlargement of the premaxillæ is contained only about two and a half times in the length of the beak.

The rugosities near the distal extremity of the premaxillæ are very strongly marked in the skull of *G. scammoni*, but only slightly in any of the skulls of *G. brachypterus*. As the largest skull of the latter species is certainly from an adult animal it is improbable that this difference is entirely due to age.

In both the older and younger skulls of *G. brachypterus* the nasal septum is ossified so as to stand above the plane of the adjacent intermaxillæ, which is not the case in *G. scammoni*.

The skulls of *G. brachypterus* are also distinguished from that of *G. scammoni* in having the beak longer and narrower, the blowhole narrower and placed further back, the width at the orbits greater and the temporal fossæ considerably larger.

The external characters considered by Professor Cope to be diagnos-
pterus are (1) the length of the pectoral fin, and (2) the
n of the dorsal fin.
he length of the pectoral fin, I find by comparing the

measurements of the type specimen and the Dam Neck Mills specimen of *G. brachypterus* with those given by Scammon for *G. scammoni* (Marine Mammalia, p. 86), that the pectoral fin was relatively shorter in the two former individuals than in Scammon's specimen. In the latter the length of the pectoral fin is 18.3 per cent. the total length, while in the type of *G. brachypterus* it is 16.4 per cent., and in the Virginia specimen of the same species, 16.9 per cent.

The distance from the extremity of the head to the anterior base of the dorsal fin in the type of *G. brachypterus* as given by Professor Cope, is relatively less than in any other blackfish of which I have examined the record. It equals 24.6 per cent. of the total length. In the Virginia specimen the distance to the dorsal is 25.9 per cent. of the total length; in *G. scammoni* it is 29.0 per cent. Here again, therefore, the two specimens of *G. brachypterus* agree with one another and contrast with *G. scammoni*, the dorsal fin being nearer the head in the two former specimens than in the latter.

In the breadth of the flukes we find the same relationship retained. The flukes are broader relatively in both specimens of *G. brachypterus* than in *G. scammoni*. In the latter they equal 22.6 per cent. of the total length, in the type of *G. brachypterus* 25.1 per cent., and in the Virginia specimen of the same species, 28.6 per cent.

Though I am convinced that there is very considerable variation in the proportions of parts in individuals of the same species, I nevertheless think that the differences shown in the percentages given above, may be taken as supplementing the differences observable in the skull, in distinguishing the east-coast blackfish from the west-coast blackfish.

No specimens of *G. brachypterus*, so far as I am aware, have been taken north of Delaware Bay, while on the other hand there are no records indicating that *G. melas* ranges farther south than Long Island, New York. The southern limit of the range of *G. brachypterus* is not determinable at present. It is probable that the species is found throughout the Gulf of Mexico and also the West Indies, if we may take into consideration a skull in the Paris Museum from Guadaloupe Island, and which is the basis of

Globiocephalus guadaloupensis Gray.

This skull is figured in the *Ostéographie* (p. 556, pl. 52, fig. 3), under the name of *G. intermedius*. It appears, however (to judge by the figure cited), to be identical with *G. brachypterus*. If there are specific differences they are yet to be pointed out. Gray, as already stated, made this skull the type of a new species or rather subspecies, *G. guadaloupensis* (Suppl. Cat. Seals and Whales, 1871, p. 84). He, however, gave no description of it, but merely cited Gervais' figure.

Measurements of four skulls of Globicephalus brachypterus and one skull of G. scammoni (probably the type).

Measurements.	G. brachypterus.				G. scammoni.
	Dam Neck Mills. ♂ 22561.	Osprey, Fla.			
		22571.	22570.	22572.	9074.
	Cm.	Cm.	Cm.	Cm.	Cm.
Total length	66.2	61.2	68.6	69.0	69.0
Length of the beak	33.3	31.6	34.0	35.3	31.0
Width of beak at its base	28.8	26.2	31.5	31.7	30.8
Width of beak at its center	23.5	23.1	24.0	26.9	25.2
Width of intermaxillæ at same point	22.9	23.0	24.0	27.4	23.6
Extremity of beak to blowhole	46.0	41.5	48.1	47.7	41.8
Extremity of beak to pterygoid	45.2	42.2	46.4	47.9	45.5
Length of tooth line	18.3	15.1	17.4	18.3	20.2
Width of skull at the orbits	45.0	42.2	49.0	50.2	48.7
Width of blowhole	9.0	8.5	10.0	9.6	10.8
Length of temporal fossa	16.3	14.6	17.2	19.0	14.8
Depth of temporal fossa	10.2	9.7	11.0	12.3	9.0
Number of teeth	7–8	8–8	9–8	8–8 8–8	8–8

GLOBICEPHALUS SIEBOLDII Gray.

Delphinus globiceps, Schlegel, Fauna Japon., Mammalia, 1844 (?), p. 17, p. 27, figs. 1–4.

Globiocephalus Sieboldii, Gray, Zool. Erebus and Terror, 1846, p. 32.

I should be inclined to pass over this species as founded upon too young a specimen to be seriously considered, were it not that in Schlegel's figure of the exterior at least one peculiar character is indicated. This character relates to the shape of the pectoral fin. In other species the pectoral fins come gradually to an acute termination, but in Schlegel's animal they are represented as being fully one-half as broad immediately behind the extremity as across the middle. This gives the fins an entirely different appearance from those of the other species. If the figure is correct, and if the character proves constant, Schlegel's specimen must be regarded as belonging to a distinct species. The animal was so young that the characters of the skull are not of great importance. The extremity of the vomer has the appearance of being bifurcated, one-half being applied to the wall of either intermaxillary bone. This disposition of parts is found in the species of some genera, but not in other species of *Globicephalus*.

Resting upon so insufficient a basis, the species must be looked upon as of doubtful value, until more specimens from the waters of Japan have been acquired and studied. It will very probably prove to be identical with *G. scammoni*, to which its uniformly black coloration and expanded intermaxillæ show it to be allied.

Globiocephalus australis and sibo, Gray.

Globiocephalus australis is merely a name inserted by Gray in the Supplement to the Catalogue of Seals and Whales (p. 85). It was never described.

Globiocephalus sibo, which appears in the same work (l. c.), is a name attached by Gray to an unrecognizable cetacean, stated by Schlegel in the *Fauna Japonica* to be considered by Japanese writers a variety of the blackfish. It should be expunged.

16. PSEUDORCA Reinhardt.

Pseudorca, Reinhardt, K. Dansk. Videns. Selsk. Forhandl., 1862, p. 151.

This genus is sufficiently well distinguished from *Orca*, its nearest ally, by its small dorsal fin, pointed pectorals, short alveoli, closely approximated pterygoids and other characters, pointed out by Reinhardt and Professor Flower, to merit a separate generic appellation.

PSEUDORCA CRASSIDENS (Owen).

Phocæna crassidens, Owen, British Fossil Mammals and Birds, 1846, p. 516.
Orca crassidens, Gray, Zool. Erebus & Terror, 1846, p. 33; Catalogue of Cetacea, 1st ed., 1850, p. 94.
Pseudorca crassidens, Reinhardt, K. Dansk. Videns. Selsk. Forhandl., 1862, p. 151.
Orca meridionalis, Flower, Proc. Zool. Soc. London, 1864, p. 420.
Orca destructer, Cope, Proc. Acad. Nat. Sci. Philadelphia, 1866, p. 293.
Globiocephalus Grayi, Burmeister, Anales Museo Pub. Buenos Aires, I, 1864–'69, p. 367, Pl. XXI.

According to Professor Flower, the subfossil specimen which formed the type of this species, from the Lincolnshire fens, is lost.* We have, therefore, only Sir Richard Owen's description and figures to guide us in identifying other specimens with the type. An examination of these leaves little room for doubt that Reinhardt's specimens were specifically identical with Sir Richard Owen's type. Professor Flower has also recently stated his opinion that the form previously described by him under the name of *Orca meridionalis* is identical with that described by Reinhardt. The former writer has had greater opportunities than myself for the comparison of specimens of this species, but my own more limited studies lead me to concur in his opinion regarding the specific identity of all the specimens of the genus thus far acquired.

Of four skulls in the Royal College of Surgeons, Nos. 2984, 2985, 2986, 2987 (respectively, 58.04^{cm}, 59.4^{cm}, 58.4^{cm}, 51.05^{cm}), No. 2985, which is the largest, is much the heaviest, having a rounded broad, snout and strong ridges about the temporal fossæ. The maxillary and malar bones at the notch are especially thickened. The triangular prenareal region is concave in No. 2987, the youngest specimen, but is flatter in different degrees in the other skulls. The strength of the ridge forming the posterior margin of the temporal fossa increases greatly from its condition in No. 2987, the youngest specimen, to No. 2985, the oldest, so that the distance between the margins of the fossæ is absolutely greater in the smaller skull. The pterygoids in these skulls are slightly separated

* Flower, Cat. Osteol. Specimens in R. Coll. Surg. London, Part II, Mammalia, 1884, p. 573.

and in the smaller number of teeth; the premaxillary bones are relatively narrower throughout the greater part of their length."* As regards the breadth of the beak anteriorly, it should be stated that the skulls of *P. meridionalis* described prior to the date of Professor Cope's writing were young, while the beak under consideration is from an old individual, as is shown by the partial anchylosis of the premaxillæ with the maxillæ, and the worn condition of the teeth. The teeth in this specimen are $\frac{8-8}{9-9}$, and exceed, therefore, the number in one of the specimens of *P. meridionalis* (No. 2984) in the Royal College of Surgeons, in which the number is $\frac{8-8}{8-8}$. As regards the posterior tooth "being the last of the maxillaries, instead of the mandibulars, as in *meridionalis*," I do not think any cetologist would insist upon this as a specific character. The last maxillary tooth was evidently the farthest back in the skull from the northeast coast in the National Museum, and is so in the skull figured by Van Beneden and Gervais (*Ostéog.*, Pl. L, figs. 8 and 8*a*). I can not regard the specimen as other than *P. crassidens*. The proportions of the mandible and beak are as follows:

Measurements of No. 3679. *Off Paita, Peru.*

	Inches.
Greatest length of mandible	20.75
Length of symphysis	3.8
Length of tooth row	9.0
Depth between angle and coronoid process	6.1
Breadth of beak in front of third tooth (counting from posterior end of row)	8.25
Breadth of intermaxillæ at same point	5.6
Length of tooth row	8.4

Globiocephalus Grayi Burmeister.

Gervais† and Reinhardt‡ have already expressed their belief in the identity of this species with *P. crassidens*, and there is apparently no reason for dissent from their opinion. It has one tooth more above on each side than is common, and all the teeth are very much worn, though the skull differs in length from No. 10320 in the national collection by only three-tenths of an inch. In the characters pointed out by Burmeister in his monograph as peculiar to this skull, it agrees with the specimens of *P. crassidens* which I have examined.

Pseudorca? mediterranea Giglioli.

Professor Giglioli describes in the Zoologischer Anzeiger (V, 1882, p. 289) under this name a species found in the Mediterranean.

He gives, however, no characters by which its relationships can be determined. The teeth are $\frac{9}{9}$ or $\frac{10}{10}$. The total length of the skull in the Royal Zoological Museum in Florence is 61^{cm} long; its greatest breadth is 46^{cm}.

* Proc. Acad. Nat. Sci. Philadelphia, 1866, p. 293.

† Gervais, Journ. de Zoologie, I, p. 68; Journ. de Zoologie, II, p. 36. Ostéographie des Cétacés, p. 548.

‡ Reinhardt, Videns. Meddel. Natur. Förening.

2. ARTIFICIAL KEY TO THE GENERA, BASED ON CRANIAL CHARACTERS.

Pterygoid bones not extending backward across the optic canal to articulate with the squamosal.

Maxillary teeth deciduous, absent in adult skulls. Mandibular teeth few, confined to the region of the symphysis. Triangular area in front of the superior nares convex ..... 14. *Grampus.*

Maxillary and mandibular teeth both present.

Teeth with compressed, spade-shaped crowns.

Rostrum one-third the total length of the skull..... 11. *Neomeris.*

Rostrum exceeding one-third the total length of the skull..... 12. *Phocæna.*

Teeth conical, rugose.

Mandibular symphysis long; rostrum very long and narrow. Pterygoid bones in contact ..... 2. *Steno.*

Teeth conical, smooth.

Palate with two distinct lateral grooves.. ..... 4. *Delphinus.*

Palate without lateral grooves.

Rostral portion of intermaxillæ convex.

Pterygoid bones separate..... 1. *Sotalia.*

Pterygoid bones in contact.

Teeth small and numerous (37 to 52)..... 5. *Prodelphinus.*

Teeth larger (22 to 26) ..... 3. *Tursiops.*

Rostral portion of intermaxillæ flat.

Triangular area in front of superior nares raised, forming a prominent table..... 8. *Sagmatias.*

Triangular area in front of superior nares not raised above the plane of the surrounding surfaces.

Maxillæ not thickened about the maxillary notch.

Outer border of the proximal end of the intermaxillæ overhanging the adjacent surface of the maxillæ ..... 6. *Tursio.*

Outer border of the proximal end of the intermaxillæ continuous with the adjacent border of the maxillæ..... 10. *Cephalorhynchus.*

Maxillæ thickened about the maxillary notches.

Teeth small and numerous ..... 7. *Lagenorhynchus.*

Teeth few, confined to the anterior half or anterior two-thirds of the rostrum. Pterygoid bones in contact.

Intermaxillæ greatly expanded on the rostrum, covering the greater part of the maxillæ. Teeth confined to the anterior half of the rostrum ..... 15. *Globicephalus.*

Intermaxillæ moderate. Teeth in the anterior two-thirds of the rostrum..... 9. *Feresa.*

Teeth few, small, occupying nearly the whole length of the rostrum. Pterygoid bones widely separated ..... 13. *Orcella.*

Teeth few and large; roots cylindrical. Pterygoid bones in contact. Intermaxillæ of equal breadth throughout . .....16. *Pseudorca.*

Teeth few and large with compressed roots. Pterygoid bones approximated but not touching. Intermaxillæ expanded proximally. 17. *Orca.*

Pterygoid bones extending backward across the optic canal and articulating with the squamosal. Expanded proximal end of the maxillæ in the same plane with the distal portion.

Teeth present, irregular, obliquely implanted in the jaws. No tusks. 18. *Delphinapterus.*

Teeth only in the form of two straight tusks, concealed in the female. The left (occasionally the right also) greatly developed in the male and spirally grooved ..... 19. *Monodon.*

Prior to the year 1865 naturalists seemed to have been pretty well agreed that there existed but one species of white whale, the "beluga," "witfisch," or "weissfisch." We must except Gray and Desmarest, however, the former having erected *D. Kingii* on a specimen supposed to have come from New Holland, and the latter having made a distinct species of Duhamel's Dauphin blanc du Canada (*D. canadensis*). Of these species more will be said subsequently.

In 1865 Professor Cope, having studied the material brought back by Drs. Hayes and Kane, divided the genus into three sections from osteological characters, and assigned *B. rhinodon* and *catodon* to the first, *declivis* to the second, and *concreta* to the third.

Upon examination of the diagnosis it appears that the same characters, thirty-six in number, are, with eight exceptions, repeated in two or more species in different combinations. Thus *rhinodon* and *declivis* have the vomer well developed between the palatines, while *concreta* has not. On the other hand *declivis* and *concreta* have the beak one-half the total length of the skull, but *rhinodon* not. Of five skeletons in the British Museum and at Oxford none exhibit the same combination of characters exhibited by any of Professor Cope's species, nor did any two agree together. Thus No. 367*a* (British Museum) has the palatines barely in contact, a character peculiar to *rhinodon*, but it has also the beak equally one-half the length of the skull, and the teeth 9–9, which is not the case in *rhinodon*. No. 268*a* has three characters of *catodon*, but has the muzzle less than one-half the length of the skull, and the vomer well developed between the palatines, which is not the case in *catodon*.

It therefore appears that each of these five specimens must be regarded as the type of a new species, or the divisions of the original species, *D. leucas*, must be broken down; for the former course there is apparently no warrant.

Let us examine the characters themselves. The first character of Professor Cope's sections relates to the cervical vertebræ. In section *a* and *aa* those vertebræ are separated, in *aaa* the axis and third vertebra are anchylosed together. It is doubtful whether this is anything more than an individual variation. In a skeleton in the national collection the third cervical is anchylosed to the axis on the left side, but not on the right side; the area of attachment is small. In one of two skeletons of *L. acutus* now on my tables, the first three cervicals are united by the centra, and the first four by the spines, the remaining cervicals being free; in the second skeleton the first three cervicals are united by the centra, and the first five by the spines, while the sixth and seventh cervicals are also united together by their neural arches and spines.

Such variations in the amount of anchylosis of the cervicals are of frequent occurrence in this and other species of the *Delphinidæ*, and certainly do not indicate specific diversity. The presence or absence of a

vertebrarterial canal is likewise an individual character. The variation of one in the number of pairs of ribs is not considered of specific importance. The shortness of the muzzle in *rhinodon* is doubtless due to the immaturity of the specimen. The amount of expansion of the vomer and palatines in the median line is a character which varies greatly with age. The question of the number of teeth presents some difficulties. I have never seen a white whale skull with so few as four or six teeth. The number in twelve skulls in the Museum varies from eight to eleven.

As regards the relative positions of the anterior extremity of the exposed prenareal portion of the maxilla and the maxillary notch it may be said that in the twelve skulls mentioned above this part of the maxilla appears at different points from almost exactly opposite the notch to a point about midway between the line of the notches and the superior nares.

On the whole I am inclined to reunite all of Professor Cope's species under the original name and to hold that in the Arctic seas, at least, but one species of white whale has been discovered.

As regards Gray's *D. Kingii*, reported to have come from New Holland, it can only be said that considering that no white whale has been observed in the South seas, and that the type skull agrees with others from northern waters, there is strong probability that the locality given by Gray is erroneous. There is a skull in the national collection from Pastolik, Alaska, near the mouth of the Yukon, which agrees almost exactly with the type of *D. Kingii*. In both the length of the beak is about 40 per cent. of that of the skull, the breadth at the notch is a third of the total length, and the breadth of the intermaxillæ at the middle of the beak equals the distance from the last tooth to the maxillary notch.

Of Desmarest's *Delphinus canadensis*, founded on Duhamel's *Marsouin blanc*, little need be said. Duhamel states that he never has himself seen this animal nor any of the other porpoises which he figures. His words are:

> Enfin on m'a envoyé de Canada, sous le nom de *Marsouin blanc*, de douze pieds de longueur, le dessein (fig. 4), qui avait le museau très petit et le front fort élevé.*

In the explanation of the plates he says:

> Celui, fig. 4, est nommé *Marsouin blanc*, à cause de la couleur de sa peau; il a le front très-gros.†

All of Duhamel's figures of porpoises are very incorrect, and his representation of the white whale resembles that animal perhaps as much as those of the killer and the bottle-nose resemble those species. It is unwise to give such obviously inaccurate figures serious consideration, and it is certain that in the light of present knowledge, Desmarest would not have erected a species on the *Marsouin blanc*.

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* Duhamel, Traité des Pesches, vol. iv, pt. 2, sect. x, Chap. II, 1782, p. 41 (Pl. x, fig. 4).

† L. c., p. 64.

Table of measurements.

DELPHINAPTERUS LEUCAS.

Catalogue number.	Collection.	Type of—	Locality.	Sex and age.	Total length.	Length of beak.	Breadth of beak—		Breadth of intermaxillæ at middle of beak.	Greatest breadth between outer margins of intermaxillæ proximally.
							At base of maxillary notch.	At its middle.		
					Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*
7535	U. S. Nat. Mus	.....	Pastolik, Alaska	....	40.0	16.4	13.3	7.3	4.7	9.8
2958	R. Col. Surg.	.....	.....	....	55.3	26.4	18.3	9.9	5.6	11.7
2962	....do	.....	.....	....	59.2	30.2	18.5	12.2	5.3	11.8†
2960	....do	.....	.....	....	54.4	25.4	16.5	9.5	?5.0	11.3†
2961	....do.	.....	.....	....	53.1	24.8	16.8	9.4	4.5	10.9†
367*c*	Brit. Mus.....	.....	Eschscholtz Bay	....	50.8	25.4	16.3	8.6	4.7	10.7
367*d*	....do	.....	Greenland	Jr.	37.1	13.2	10.5	6.1	3.6	9.0
367*a*	....do	.....	....do	....	63.5	32.4	20.6	14.8	6.0	12.5
368*a*	Brit. Mus....	*D. Kingii* .	New Holland ...	....	36.0	14.0	11.9	7.1	4.1	8.9

Catalogue number.	Length of tooth-line.	Last tooth to base of maxillary notch.	Extremity of beak to—		Breadth between—		Temporal fossæ.		Length of mandible.	Length of symphysis of mandible.	Length of tooth-row of mandible.	Depth between angle and coronoid process.	Diameter of largest tooth.	Number of teeth.
			Anterior margin of superior nares.	End of crest of pterygoid.	Orbits.	Hinder margins of temporal fossæ.	Length.	Depth.						
	Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	
7535	13.0	4.6	24.0	23.7	20.1	.....	.....	6.0	.....	.....	.....	.....	.....	.....
2958	18.7	7.9	38.5	36.5	27.2	18.5	15.2	6.6	41.9	7.4	17.0	10.4	.....	$\frac{10-10}{9-9}$
2962	24.4	7.1	40.8	40.8	29.9	20.0‡	18.2	9.9	.....	.....	.....	.....	.....	$\frac{9-9}{?-?}$
2960	20.0	6.5	36.0	35.3	25.4	20.1‡	15.7	8.4	.....	.....	.....	.....	.....	$\frac{9-9}{?-?}$
2961	18.3	7.6	35.6	34.0	25.7	19.4‡	15.4	7.1	40.0	6.5	18.7	9.9	.....	$\frac{7-8}{9-9}$
367*c*	19.3	5.8	33.7	34.3	23.6	21.3§	14.0	7.4	.....	.....	.....	.....	.....	$\frac{9-9}{?-?}$
367*d*	10.2	4.6	20.1	19.8	18.0	20.0§	.....	6.1	24.9	4.1	9.2	7.8	.....	$\frac{9-9}{10-9}$
367*a*	26.2	8.5	46.3	43.7	31.2	23.4§	17.8	8.5	47.2	8.3	19.1	11.7	1.4	$\frac{9-9}{8-9}$
368*a*	11.2	4.1	21.1	.....	18.8	19.2§	.....	6.1	26.1	3.8	9.4	7.5	0.28	$\frac{9-9}{9-9}$

* Brooke's collection. † On line with anterior margin of nares. ‡ Least.
§ Between walls of the fossæ.

SYNOPSIS OF THE SPECIES OF DOLPHINS.

1. ARTIFICIAL KEY TO THE GENERA, BASED ON EXTERNAL CHARACTERS.

Head with a beak which is usually distinctly marked off from the forehead by a constriction.

Dorsal fin absent ..... 6. *Tursio.*

Dorsal fin present; triangular or ovate.

Beak not distinctly marked off from the forehead ..... 10. *Cephalorhynchus.*

Dorsal fin present; falcate.

Beak distinct, short and rim-like ..... 7. *Lagenorhynchus.* ? 8. *Sagmatias.** ? 9. *Feresa.**

Beak distinct, elongated.

Symphysis of mandible long.

Crowns of teeth rugose ..... 2. *Steno.*

Crowns of teeth smooth ..... 1. *Sotalia* sps.

Symphysis of mandible short.

Sides without longitudinal bands of color ..... 3. *Tursiops.* 1. *Sotalia* sps. 5. *Prodelphinus* sps.

Sides with longitudinal bands of color ..... 4. *Delphinus.* 5. *Prodelphinus* sps.

Head without a beak, or with merely an obtuse ridge margining the upper jaw.

Crowns of teeth compressed, spade-shaped.

Dorsal fin absent ..... 11. *Neomeris.*

Dorsal fin present, triangular or slightly falcate ..... 12. *Phocæna.*

Teeth conical, nearly or quite upright in the jaws.

Teeth in upper jaw deciduous; mandibular teeth few, confined to the region of the symphysis ..... 14. *Grampus.*

Teeth persistent in both jaws.

Pectoral fins very long and narrow; teeth confined to the anterior half of the rostrum ..... 15. *Globicephalus.*

Pectoral fins broad, ovate; dorsal fin very high and prominent (especially in the male), size large ..... 17. *Orca.*

Pectoral fins moderate, falcate.

Teeth few and large; color black; size large. Pelagic ..... 16. *Pseudorca.*

Teeth small; color bluish-gray. Fluviatile ..... 13. *Orcella.*

Teeth irregular and implanted obliquely in the jaws.

Pectoral fins broad, dorsal fin rudimentary; color white ... 18. *Delphinapterus.*

Teeth wanting (*i. e.*, tusks concealed in the female), or present in the form of a single, very long, straight, spirally grooved tusk (*i. e.*, right tusk concealed in male; rarely both right and left developed). 19. *Monodon.*

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* Known only from skulls.

2. ARTIFICIAL KEY TO THE GENERA, BASED ON CRANIAL CHARACTERS.

Pterygoid bones not extending backward across the optic canal to articulate with the squamosal.

Maxillary teeth deciduous, absent in adult skulls. Mandibular teeth few, confined to the region of the symphysis. Triangular area in front of the superior nares convex ..... 14. *Grampus.*

Maxillary and mandibular teeth both present.

Teeth with compressed, spade-shaped crowns.

Rostrum one-third the total length of the skull ..... 11. *Neomeris.*

Rostrum exceeding one-third the total length of the skull ..... 12. *Phocæna.*

Teeth conical, rugose.

Mandibular symphysis long; rostrum very long and narrow. Pterygoid bones in contact ..... 2. *Steno.*

Teeth conical, smooth.

Palate with two distinct lateral grooves ..... 4. *Delphinus.*

Palate without lateral grooves.

Rostral portion of intermaxillæ convex.

Pterygoid bones separate ..... 1. *Sotalia.*

Pterygoid bones in contact.

Teeth small and numerous (37 to 52) ..... 5. *Prodelphinus.*

Teeth larger (22 to 26) ..... 3. *Tursiops.*

Rostral portion of intermaxillæ flat.

Triangular area in front of superior nares raised, forming a prominent table ..... 8. *Sagmatias.*

Triangular area in front of superior nares not raised above the plane of the surrounding surfaces.

Maxillæ not thickened about the maxillary notch.

Outer border of the proximal end of the intermaxillæ overhanging the adjacent surface of the maxillæ ..... 6. *Tursio.*

Outer border of the proximal end of the intermaxillæ continuous with the adjacent border of the maxillæ ..... 10. *Cephalorhynchus.*

Maxillæ thickened about the maxillary notches.

Teeth small and numerous ..... 7. *Lagenorhynchus.*

Teeth few, confined to the anterior half or anterior two-thirds of the rostrum. Pterygoid bones in contact.

Intermaxillæ greatly expanded on the rostrum, covering the greater part of the maxillæ. Teeth confined to the anterior half of the rostrum ..... 15. *Globicephalus.*

Intermaxillæ moderate. Teeth in the anterior two-thirds of the rostrum ..... 9. *Feresa.*

Teeth few, small, occupying nearly the whole length of the rostrum. Pterygoid bones widely separated ..... 13. *Orcella.*

Teeth few and large; roots cylindrical. Pterygoid bones in contact. Intermaxillæ of equal breadth throughout ..... 16. *Pseudorca.*

Teeth few and large with compressed roots. Pterygoid bones approximated but not touching. Intermaxillæ expanded proximally. 17. *Orca.*

Pterygoid bones extending backward across the optic canal and articulating with the squamosal. Expanded proximal end of the maxillæ in the same plane with the distal portion.

Teeth present, irregular, obliquely implanted in the jaws. No tusks. 18. *Delphinapterus.*

only in the form of two straight tusks, concealed in the female. The left (occasionally the right also) greatly developed in the male and spirally grooved ..... 19. *Monodon.*

SUBFAMILY I. DELPHININÆ.

1. SOTALIA Gray.

Rostrum long, narrow, and compressed. Symphysis of mandible long or moderate. Pterygoid bones separate, narrow, and divergent posteriorly. Postorbital process of frontal narrow. Teeth moderate, smooth, 26 to 35. Vertebræ 51 to 55.

Head prolonged into a distinct beak. Dorsal fin falcate. Pectoral fins broad at the base, falcate (oval in *S. fluviatilis*), moderate.

Color white or gray, sometimes spotted; no bands of dark color.

SOTALIA SINENSIS Flower.

(Plate 1, fig. 3.*)

"Milky white, with pinkish fins and black eyes" (Swinhoe.)

Teeth $\frac{32}{32}$. Vertebræ: C. 7; D. 12; L. 10; Ca. 22=51.

Temporal fossæ large, rounded. Rostrum rather broad at the base, long, tapering. Palato-pterygoid region constricted. Inner margins of pterygoids separated, parallel proximally, divergent distally. Crowns of teeth smooth, conical, and incurved.

Measurements of the skull.—Total length, 20.7 inches (52.6^{cm}); length of beak, 12.8 inches (32.5^{cm}); breadth of beak at base, 4.7 inches (11.9^{cm}); breadth of same at its middle, 1.85 inches (4.7^{cm}); length of upper tooth-row, 11.2 inches (28.4^{cm}); greatest breadth at postorbital processes of frontal, 8.8 inches (22.4^{cm}).

Habitat.—Quemoy Island, harbor of Amoy, China. ? Foo-chow River (*Swinhoe*). Canton River (*Osbeck*).

SOTALIA PLUMBEA (Cuvier).

(Plate 1, figs. 1 and 2.)

Snout very long; distance from the tip of the snout to the eye one-sixth the total length; dorsal commencing at the end of the first third

* The plates accompanying this synopsis contain, for the most part, reproductions of the best figures of the different species to be found in the literature. For the figures of skulls I have drawn largely upon the admirable illustrations in the atlas of Van Beneden and Gervais' *Osteógraphie des Cétacés*, and in Gray's *Synopsis of Whales and Dolphins*. Most of the figures of species described by American authors, however, are new, and have been drawn from specimens in the National Museum.

In the diagnoses I have attempted to give the mean number of teeth (on one side of each jaw) for those species of which numerous skulls are to be found in the museums, but in giving the number of vertebræ I have in some cases indicated the extremes of variation as far as known.

of the length; long and but little elevated; caudal ridges prominent. Breadth of flukes equal to one-fourth the total length.

Color uniform plumbeous gray, except on the extremity and under side of the lower jaw, where it is white.

Teeth $\frac{37}{37}$. Rostrum of skull exceeding three-fifths the total length of the skull, very narrow and obtusely pointed; its breadth at the middle one-sixth its length. Vomer not visible on the palate. Temporal fossæ large and rounded, their length about equal to the breadth of the rostrum at its base. Symphysis of the mandible about one-third the length of the mandible.

Measurements of the exterior (Pucheran).—Total length, 92.9 inches (236^{cm}); tip of snout to dorsal fin, 33.7 inches (85.5^{cm}); to pectoral fin, 22.8 inches (58^{cm}); to eye, 14.9 inches (37.8^{cm}); length of anterior margin of dorsal fin, 16.7 inches (42.5^{cm}); its vertical height, 5.9 inches (15^{cm}); length of anterior margin of pectoral fin, 13.8 inches (35^{cm}); breadth of flukes, 21.7 inches (55^{cm}).

Measurements of the skull.—Total length, 55.9^{cm}; length of beak, 34.9^{cm}; breadth of beak at base, 11.3^{cm}; at its middle, 4.3^{cm}; breadth between orbits, 19.2^{cm}; length of temporal fossa, 11.2^{cm}.

Habitat.—Indian Ocean. Malabar coast, India (*Dussumier*).

SOTALIA GADAMU (Owen).

(Plate 2, figs. 1 and 2.)

Body fusiform, gaining its greatest diameter at the fore part of the dorsal fin. Forehead convex. Snout long and compressed. Pectoral and dorsal fins falcate and of about equal size; the former commence at the beginning of the second fourth of the total length of the body.

Color of body "dark plumbeous grey, almost black upon the fins, especially at their fore part, becoming very gradually lighter to the longitudinal parallel of the attachment of the pectorals, below which the body, from beneath the base of the snout and eye to below the base of the tail, is of a pinkish ashy-grey tint, with a few small irregular blotches of light plumbeous grey" (Owen).

Teeth $\frac{26}{26}$. Rostrum of skull less than three-fifths the length of the skull, depressed, and obtusely rounded off in front; its breadth at the middle about one-fifth its length. Vomer visible in the center of the palate. Pterygoids narrow, curved outwards, and sharply keeled. Length of the temporal fossæ only a little less than the breadth of the beak at its base. Length of the symphysis of the mandible somewhat less than one-third the total length of the mandible.

Measurements of the exterior.—♀ adult (Owen): Total length, 82 inches (209.1^{cm}); tip of snout to dorsal fin, 36 inches (91.8^{cm}); length of pectoral fin (along anterior margin), 18 inches (45.9^{cm}); length of base [illegible]al fin, 13 inches (33.2^{cm}); breadth of flukes, 22 inches (56.1^{cm}).

[illegible]rements of the skull.—(82, 1, 2, 3, British Museum): Total length,

43.2cm; length of rostrum, 25.3cm; breadth of beak at base, 9.3cm; breadth of same at its middle, 5cm; breadth between orbits, 17.2cm; length of temporal fossa, 8.8cm.

Habitat.—Indian Ocean. Vizagapatam (*Owen*); Karachi; Australia (*Flower*).

SOTALIA LENTIGINOSA (Owen).

(Plate 2, fig. 3.)

General form as in *S. gadamu*, but with smaller pectoral and dorsal fins, and broader flukes. Caudal ridges prominent.

The color is pretty uniformly bluish cinereous, or slaty, freckled with irregular small spots or streaks of brown or plumbeous pigment, the streaks longitudinal and flecked with white; the under surface is a shade lighter than the rest of the body. (Owen.)

Teeth $\frac{33}{34}$. Skull narrower than in *S. gadamu*. Occipital condyles and temporal fossæ larger. Breadth of the rostrum at the middle one-sixth its length.

Measurements of the exterior.— ♀ adult (Owen): Total length, 94 inches (239.7cm); length of snout, 6 inches (15.3cm); length of mouth, 12 inches (30.6cm); tip of snout to base of pectoral fin, 24 inches (61.2cm); length of pectoral (along anterior curve), 12 inches (30.6cm); tip of snout to dorsal fin, 40 inches (102cm); breadth of flukes, 21 inches (53.6cm).

Measurements of the skull.—(1476*a*, British Museum. Type): Total length, 47cm; length of beak, 28.2cm; breadth of beak at base, 10.2cm; at its middle, 4.7cm; breadth between orbits, 17.4cm; length of temporal fossa, 10.2cm.

Habitat.—Vizagapatam, India (*Owen*).

SOTALIA GUIANENSIS (Van Beneden).

See Van Beneden, Mém. Couron. Acad. Roy. Belgique, coll. in 8°, XVI, 1864, Art. 2.

Also page 17.

Habitat.—Cayenne, French Guiana.

SOTALIA BRASILIENSIS Van Beneden.

(Plate 3, figs. 1 and 2.)

See page 17.

Habitat.—Bay of Rio de Janeiro.

SOTALIA TUCUXI (Gray).

(Plate 5, fig. 2.)

See page 17.

Habitat.—Amazon River; mouth of Tocantins River (*Bates*); ? Florida (*U. S. National Museum*).

Teeth $\frac{26}{26}$. Vertebræ, C. 7; D. 12; L. 16; Ca. 26=61. Skull as in *T. catalania*, but narrower across the orbits and with the beak narrower at its base.

Measurements of the exterior (from Rüppell).—♀ adult. Total length, 76.4 inches (194.9^{cm}); tip of snout to eye, 11.6 inches (29.7^{cm}); to dorsal fin, 35 inches (89.3^{cm}); vertical height of dorsal fin, 8.5 inches (21.6^{cm}); breadth of flukes, 20.2 inches (51.4^{cm}).

Measurements of the skull.—(Type.) Total length, 46^{cm}; length of rostrum, 27^{cm}; breadth of rostrum at its base, 9.2^{cm}; breadth of intermaxillæ at same point, 3.4^{cm}; breadth between orbits, 18.7^{cm}.

Habitat.—Red Sea.

TURSIOPS GILLII Dall.

(Plate 10, figs. 1 and 2.)

Exterior known only from an outline drawing and record of two "momentary observations" by Scammon.

In general form similar to *T. tursio*. Color "black all over, lightened a little below."

Teeth $\frac{22}{22}$. Skull like that of *T. tursio* in form and size. Condyles of the mandible large, their greatest diameter contained twice in the greatest depth of the ramus. Optic canal not rising to the level of the inferior surface of the frontal bone, which is deeply concave in front of it. Lower end of visible portion of parietal a narrowish band, between the squamosal and a backward prolongation of the frontal.

Measurements of the skull.—Total length, 51^{cm}; length of rostrum, 29.8^{cm}; breadth of rostrum at its base, 14.1^{cm}; at its middle, 8.8^{cm}; breadth between orbits, 24.5^{cm}; length of temporal fossa, 13.5^{cm}.

Habitat.—North Pacific Ocean: Monterey, Cal., and Lower California. (*U. S. National Museum.*)

4. DELPHINUS Linné.

Palate with two deep lateral grooves. Rostrum long and narrow. Pterygoid bones normal, in contact. Symphysis of mandible short. Teeth small, acutely pointed, and numerous, 47 to 65. Vertebræ, 73 to 76.

Head with a distinct long beak. Dorsal and pectoral fins falcate, moderate. Color black above, lighter below, with several conspicuous longitudinal bands.

DELPHINUS DELPHIS Linné.

(Plate 11, figs. 1, 2, and 3.)

Body slender; forehead sloping gradually, forming a wide angle with the beak; beak long and slender (average about one fourteenth the total length); dorsal fin in the middle of the median dorsal line, narrow, and not strongly recurved above, its vertical height about one-ninth

STENO ROSTRATUS (Desmarest).

(Plate 6, figs. 1 and 2.)

Snout long, separated from the low forehead by a distinct constriction. Dorsal and pectoral fins falcate.

Color of the upper surfaces and fins purplish sooty black; sides marked with rather large stellate yellowish-white spots. Snout and under surfaces of the body white, more or less tinged with purple and rose-color, and marked with prominent purple spots. (Lütken.)

Vetebræ: C. 7; D. 13; L. 15; Ca. 30 = 65.

Teeth, $\frac{20}{20}$ to $\frac{25}{27}$; rugose. Skull massive. Rostrum long and compressed, its breadth at the middle 11.5 per cent. to 18.8 per cent. of its length. Frontal plates of the maxillæ strongly bent; intermaxillæ convex, at wide opening between them opposite the maxillary notch. Temporal fossæ very large and rounded; pterygoid bones meeting in the median line; vomer extending to the middle of the palate and visible in the median line; mandible growing gradually attenuated from behind forwards, not keeled at the symphysis. Symphysis very long.

Measurements of the skull.—(British Museum No. 346*a*. Type of *S. compressus*): Total length, 51.1^{cm}; length of rostrum, 32.5^{cm}; breadth of rostrum at its base, 9.3^{cm}; at its middle, 4.2^{cm}; breadth of intermaxillæ at same point, 2.9^{cm}; breadth between orbits, 16.4^{cm}; length of temporal fossa, 8.6^{cm}. (British Museum No. 345*c*. Type of *S. frontatus*): Total length, 51.1^{cm}; length of rostrum, 30^{cm}; breadth of rostrum at its base, 10.7^{cm}; at the middle, 5.2^{cm}; breadth of intermaxillæ at same point, 3.6^{cm}; breadth across orbits, 19 3^{cm}; length of temporal fossa, 10.7^{cm}. (For measurements of the exterior see page 28.)

Habitat.—Indian Ocean. Java. Atlantic Ocean; 1° 14′ S. lat., 17° 20′ W. long. (*Lütken.*)

STENO PERSPICILLATUS Peters.

(Plate 7, figs. 1 and 2.)

Form generally like *Tursiops tursio*. Beak distinctly separated off from the forehead. Dorsal and pectoral fins falcate.

Back black, belly white, sides of body and head yellowish white. A milk-white stripe from the pectoral fin to the eye. Eye surrounded by a brown ring, from which a narrow brownish-black line goes forward along the base of the forehead to meet its fellow on the opposite side of the head. A similar line from the corner of the mouth to the base of the pectoral fin. (Peters.)

Teeth, $\frac{23}{23}$; rugose. Vertebræ: C. 7; D. 12; L. 15; Ca. 32 = 66. Skull like that of *S. rostratus*. (See p. 25.)

Measurements of the exterior (From Peters).—Total length, 92.8 inches (185^{cm}); extremity of snout to dorsal fin, 32.3 inches (82^{cm}); to pectoral

fin, 17.3 inches (44cm); length of base of dorsal fin, 7.9 inches (20cm); height of dorsal fin, 6.3 inches (16cm); length of pectoral fin, 11 inches (28cm).

Measurements of the skull.—(Berlin Museum. Type, ♀): Total length, 49.9cm; length of rostrum, 29.3cm; breadth of rostrum at its base, 11.1cm; at its middle, 5.8cm; breadth of intermaxillæ at same point, 3.7cm; breadth between orbits, 20.4cm; length of temporal fossa, 11cm.

Habitat.—South Atlantic Ocean, 32° 29′ 7″ S. lat., 2° 1′ W. long. (*Peters.*)

3. TURSIOPS Gervais.

Rostrum moderately long, tapering; pterygoid bones normal, in contact; symphysis of mandible short; postorbital process of frontal triangular; teeth large, smooth, 22–26; vertebræ, 61 to 64.

Beak moderate, tapering, distinctly marked off from the forehead; dorsal and pectoral fins falcate; color gray or greenish, lighter below, sometimes with spots.

TURSIOPS TURSIO (Fabricius).

(Plate 8, figs. 1 and 2.)

General form stout. Forehead sloping; beak short and depressed; lower jaw usually longer than the upper jaw. Dorsal fin situated in the middle of the length, high and falcate. Pectoral fins broad at the base, obtusely rounded off at the tip, and not deeply emarginate behind.

Back, dorsal, pectoral, and caudal fins, snout, and sometimes the tip of the lower jaw and lower lip, clear, plumbeous gray, more or less tinged with purple. The gray color becomes lighter on the sides, and passes by insensible gradations into the pure white of the under surfaces. In some individuals all that portion of the body lying back of the anus is gray; in others the body is bicolor as far as the flukes. (Specimens have occasionally been captured which were entirely of a gray color.)

Teeth, $\frac{22}{22}$. Vertebræ: C. 7; D. 13; L. 17; Ca. 27=64. Skull massive. Rostrum rather broad, depressed; its length slightly exceeding one-half the total length of the skull. Intermaxillæ thick and swollen. Vomer appearing in the center of the palate. Pterygoid bones broad and obtusely keeled. Inferior surface of frontal not deeply concave in front of the optic canal. Temporal fossæ large and elliptical in outline. Inferior extremity of the parietal broad. Greatest diameter of the condyle of the mandible contained two and a half times in the greatest depth of the ramus. Teeth large. Second finger longer than the third.

Measurements of the exterior.— ♂ adult. (Flower.) Total length, 114 inches (290.7cm); length of mouth, 12.5 inches (31.9cm); tip of snout to dorsal fin, 50 inches (127.5cm); length of pectoral fin, 15.5 inches (39.5cm);

vertical height of dorsal fin, 9 inches (22.9^{cm}); breadth of flukes, 24 inches (61.2^{cm}).

Measurements of the skull.—(British Museum, 353*g*): Total length, 57.8^{cm}; length of rostrum, 32^{cm}; breadth of rostrum at base, 15.8^{cm}; at its middle, 9.7^{cm}; breadth between orbits, 28^{cm}; length of temporal fossa, 13.2^{cm}.

Habitat.—Coast of Europe: North Sea to Bay of Biscay; Mediterranean; Gulf of Lyons. Atlantic coast of North America:* Maine to Florida. Gulf of Mexico: Texas. Uruguay: Uruguay River (*Burmeister*). New Zealand: Dusky Bay (*Hector*); Seychelle Islands (*Flower*). The last three perhaps not this species.

TURSIOPS PARVIMANUS Lütken.

Smaller than *T. tursio*. Head, back, and fins blackish; belly grayish white.

Teeth, $\frac{25}{24}$. Vertebræ, 62. Ribs, 13 pairs. Pectoral fins small, about one-eighth the total length. Third finger longer than the second. (Lütken.)

Habitat.—Adriatic Sea.

TURSIOPS CATALANIA (Gray).

Upper surfaces lead-color, passing gradually on the sides into the white of the lower surfaces; sides, lower surfaces, and pectoral fins covered with longitudinally elongated blotches of dark lead-color. (Gray.)

Teeth, $\frac{25}{25}$. Skull like that of *T. tursio*, but smaller; the rostrum longer [about three-fifths the total length] and narrower.

Measurements of the exterior.— ♀ (Gray). Total length, 81 inches (206.55^{cm}); tip of snout to dorsal fin, 36 inches (91.8^{cm}); length of anterior border of dorsal fin, 13 inches (33.2^{cm}); height of dorsal fin, 8 inches (20.4^{cm}); length of pectoral fin, 13 inches (33.2^{cm}); breadth of flukes, 22 inches (56.1^{cm}).

Measurements of skull.—(Same individual—British Museum 1391*b*). Total length, 41.5^{cm}; length of rostrum, 23.8; breadth of rostrum at base, 10.4^{cm}; at its middle, 6.1^{cm}; breadth between orbits, 19^{cm}; length of temporal fossa 9.4^{cm}.

Habitat.—Northeast coast of Australia.

TURSIOPS ABUSALAM (Rüppell).

(Plate 9, figs. 1 and 2.)

Smaller than *T. tursiops*, which it resembles in general form.

Upper surface of the head and body, the tail and fins, dark sea-green. Margin of the upper lip, and entire under surface of the body to the anus whitish flesh-color; belly with small, irregularly distributed dark green spots. Iris dark green. (Rüppell.)

* The commonest species.

Teeth $\frac{26}{26}$. Vertebræ, C. 7; D. 12; L. 16; Ca. 26=61. Skull as in *T. catalania*, but narrower across the orbits and with the beak narrower at its base.

Measurements of the exterior (from Rüppell).—♀ adult. Total length, 76.4 inches (194.9^{cm}); tip of snout to eye, 11.6 inches (29.7^{cm}); to dorsal fin, 35 inches (89.3^{cm}); vertical height of dorsal fin, 8.5 inches (21.6^{cm}); breadth of flukes, 20.2 inches (51.4^{cm}).

Measurements of the skull.—(Type.) Total length, 46^{cm}; length of rostrum, 27^{cm}; breadth of rostrum at its base, 9.2^{cm}; breadth of intermaxillæ at same point, 3.4^{cm}; breadth between orbits, 18.7^{cm}.

Habitat.—Red Sea.

TURSIOPS GILLII Dall.

(Plate 10, figs. 1 and 2.)

Exterior known only from an outline drawing and record of two "momentary observations" by Scammon.

In general form similar to *T. tursio*. Color "black all over, lightened a little below."

Teeth $\frac{22}{22}$. Skull like that of *T. tursio* in form and size. Condyles of the mandible large, their greatest diameter contained twice in the greatest depth of the ramus. Optic canal not rising to the level of the inferior surface of the frontal bone, which is deeply concave in front of it. Lower end of visible portion of parietal a narrowish band, between the squamosal and a backward prolongation of the frontal.

Measurements of the skull.—Total length, 51^{cm}; length of rostrum, 29.8^{cm}; breadth of rostrum at its base, 14.1^{cm}; at its middle, 8.8^{cm}; breadth between orbits, 24.5^{cm}; length of temporal fossa, 13.5^{cm}.

Habitat.—North Pacific Ocean: Monterey, Cal., and Lower California. (*U. S. National Museum.*)

4. DELPHINUS Linné.

Palate with two deep lateral grooves. Rostrum long and narrow. Pterygoid bones normal, in contact. Symphysis of mandible short. Teeth small, acutely pointed, and numerous, 47 to 65. Vertebræ, 73 to 76.

Head with a distinct long beak. Dorsal and pectoral fins falcate, moderate. Color black above, lighter below, with several conspicuous longitudinal bands.

DELPHINUS DELPHIS Linné.

(Plate 11, figs. 1, 2, and 3.)

[illegible]ead sloping gradually, forming a wide angle with [illegible] and slender (average about one fourteenth the [illegible]l fin in the middle of the median dorsal line, narrow, [illegible]recurved above, its vertical height about one-ninth

the total length; pectoral fins about three times as long as broad, narrow in the distal half, and obtusely pointed.

Form and disposition of color-markings very variable. Back, upper jaw, tail, and fins black or dark gray; under parts white or greenish-white. The black area extends down upon the sides under the dorsal fin in the form of an angular projection (sometimes indistinct), the apex of which is met by the apex of a similar upward projection of the white of the under parts. Sides occupied by two elongated elliptical areas of light color, the anterior and larger of which is fulvous in some individuals and gray in others; the posterior area is gray. A black, gray, or greenish band extends from the lower jaw to the base of the pectoral fin (sometimes absent). Eye surrounded by a ring of black, from which a narrow black band extends forward to the base of the beak. End and margin of lower jaw usually black. One or two longitudinal bands of gray or greenish-gray traverse the light color of the lower part of the sides.

Teeth $\frac{47}{46}$ to $\frac{50}{51}$. Vertebræ: C. 7; D. 14(–15); L. 21(–22); Ca. 30 (–32)=73(–76). Rostrum depressed and elongated, its length exceeding one-half the total length (58 per cent. to 64 per cent.). Premaxillæ convex, anchylosed together in the median line. Proximal fifth of the palatal ridge with nearly parallel margins, its sides excavated by the lateral grooves. Pterygoid bones sharply keeled. Vomer appearing in the median line of the palate as a linear slip. Temporal fossæ elongated, their length a little more than one-sixth the total length of the skull.

Measurements of the exterior.—♂ (21524 U. S. National Museum. Wood's Holl, Mass.). Total length, 89 inches (226.1^{cm}); end of beak to dorsal fin, 39.3 inches (99.8^{cm}); to pectoral fin, 20.0 inches (50.8^{cm}); vertical height of dorsal fin, 9.0 inches (22.9^{cm}); length of pectoral fin, 14 inches (35.6^{cm}); breadth of flukes, 20.5 inches (52.1^{cm}).

Measurements of the skull.—(20873 U. S. National Museum. Block Island, R. I. See p. 48.) Total length, 46.7^{cm}; length of rostrum, 28.2^{cm}; breadth of rostrum at its base, 9.3^{cm}; at its middle, 5.3^{cm}; breadth between orbits, 17.1^{cm}; length of temporal fossa, 7.2^{cm}.

Habitat.—Pelagic.

DELPHINUS LONGIROSTRIS Cuvier.

(Plate 12, fig. 2.)

External characters unknown.

Teeth $\frac{65}{58}$. Rostrum of skull greatly elongated (67.9 per cent. of the total length); its breadth at the maxillary notches one-fourth its length. Length of the symphysis of the mandible one-fifth the length of the skull. Temporal fossæ large and rounded. Palatal grooves and ridge as in *D. delphis*.

Measurements of the skull.—(Type.) Total length, 49.5^{cm}; length of

rostrum, 33.7cm; breadth of rostrum at base, 8.4cm; at its middle, 3.8cm; breadth between orbits, 14.7cm; length of temporal fossa, 7.4cm.

Habitat.—Malabar coast, India.

DELPHINUS CAPENSIS Gray.

(Plate 12, fig. 1.)

See page 58.

DELPHINUS ROSEIVENTRIS Wagner.

(Plate 13, figs. 1 and 2.)

(Description from Hombron and Jacquinot's figure and Jacquinot and Pucheran's description.)

Size small. Form stout. Forehead rather abruptly sloping; beak long (one-eleventh the total length). Dorsal fin large, broad, and not strongly recurved above; its vertical height above one-ninth the total length. Pectoral fin narrow, and not deeply emarginate posteriorly; its length equal to that of the mouth.

Back, tail, and fins, beak and margin of lower jaw black or dark gray; under parts pale rose-color; lower half of side white tinged with yellowish. A circle of black surrounds the eye, from which a band extends forward to meet its fellow of the opposite side. A broad pale-gray band from the base of the pectoral fin to the eye.

Teeth $\frac{48}{48}$. Skull similar to that of *D. longirostris*, but much smaller. Length of rostrum about 65 per cent. of the total length. Intermaxillæ high and convex. Lateral grooves of the palate shallow, disappearing near the distal end. Vomer occupying about one-third of the median line of the palate. Temporal fossæ large and depressed.

Measurements of the exterior (from Jacquinot and Pucheran).—Total length, 46.5 inches (118cm); tip of beak to eye, 8.7 inches (22cm); to base of dorsal fin, 19.9 inches (50.5cm); to base of pectoral fin, 12.2 inches (31cm); length of pectoral fin (along anterior border), 8.9 inches (22.6cm); height of dorsal fin, 4.9 inches (12.5cm).

Measurements of the skull.—(a3026, Paris Museum. Type.) Total length, 37.5cm; length of rostrum, 24.4cm; breadth of rostrum at base, 7.1cm; at its middle, 3.9cm; breadth between orbits, 12.7cm; length of temporal fossa, 6.1cm.

Habitat.—Molucca Sea and Torres Strait.

5. PRODELPHINUS Gervais.

Rostrum long and narrow, or as broad as in *D. delphis*. Rostral portion of intermaxillæ convex. Pterygoid bones in contact. No lateral grooves on the palate. Symphysis of mandible short. Teeth small, acute, numerous, 37 to 52. Vertebræ, 69 to 76.

Head with a distinct elongated beak. Dorsal and pectoral fins falcate (?the former triangular in *P. frænatus*). Color black or gray above, light below, with spots or longitudinal bands.

PRODELPHINUS CÆRULEO-ALBUS (Meyen).

(Plate 14, figs. 1 and 2.)

Head rounded and much arched. Snout very flat, longer than in *D. delphis* and less compressed; lower jaw protruding a little beyond the upper jaw. Pectoral and dorsal fins pointed and not deeply emarginate behind.

Teeth $\frac{50}{50}$, conical, pointed, and curved inward. Vertebræ: C. 7; D. 14; L. and Ca. 52+. Skull similar to that of *P. euphrosyne*, but with small temporal fossæ, which are directed upward.

Back and forehead dark steel blue. A very dark blue stripe starts from the dorsal fin, and, passing forward, ends abruptly in front. A narrow blue stripe on the sides from the eye to the vent, expanded at the posterior end. Pectoral fin blue-gray, connected by a colored band with the ring which surrounds the eye. Belly, snout, and other parts of the body white. (Meyen.)

Habitat.—Coast of South America, near the mouth of the Rio de la Plata.

PRODELPHINUS EUPHROSYNE (Gray).

(Plate 15, figs. 1 and 2.)

Body robust; snout long; dorsal fin high and falcate; pectoral fins small.

Upper parts black; sides blackish; margins of the jaws blackish, their extremity entirely black; throat and belly white; circumference of the eye black. A narrow black band (broadest at the extremities) from the eye to the vent, with a branch given off above the base of the pectoral fins and running a short distance downwards and backward. A band of white, broadest in the middle, separates the lateral black band from the dark color of the sides above; another and broader black band extends from the eye to the base of the pectoral fin and has along its center a white area which communicates with the white of the throat immediately below the eye. Fins black, with a narrow line of white on their anterior margin (sometimes absent).

Teeth $\frac{45}{44}$. Vertebræ: C. 7; D. 15; L. 22; Ca. 32 = 76.

Measurements of the exterior.—Total length (on the curves), 209.7^{cm}; tip of beak to the anterior base of the dorsal fin, 93.2^{cm}; breadth of flukes, 42^{cm}; length of anterior margin of pectoral fin, 30.5^{cm}. (Pucheran: *D. marginatus.*)

Measurements of the skull.—(*Mus. d'Hist. nat.* Type of *D. margina-*

tus ♂.)—Total length, 47.5^{cm}; length of beak, 29.2^{cm}; breadth of same at the middle, 6.3^{cm}.

Habitat.—Atlantic Ocean; South Greenland (*Brown*); Shetland and Orkney Islands (*Bell*); Dieppe; mouth of Orb River; ? Mediterranean (*Mus. d'Hist. nat.*); Jamaica (*Royal Victoria Hosp., Netley*); between St. Paul and Ascension Islands (*Lütken*); South Africa (*Flower*).

PRODELPHINUS (?) LATERALIS (Peale).

(Plate 15, fig. 3.)

Form thick; snout small; body much compressed behind the dorsal fin. Color light purplish-gray; beneath white. A dark lateral line, edged with spots, separates the colors of the upper and under parts of the body; a separate line, paler in color, branches from the lateral line opposite the pectoral fins and passes downwards and backward; another connects the eyes and pectoral fins; snout black; fins black. (Peale.)

Total length, 7 feet 6 inches.

Teeth $\frac{41-41}{41?-41?}$. (Cranial characters unknown.)

Habitat.—Pacific Ocean, lat., 13° 58′ N.; long., 161° 22′ W.

PRODELPHINUS (?) PLAGIODON (Cope).

(Plate 18, figs. 1 and 2.)

General form like that of *Delphinus delphis*. Dorsal fin high and strongly recurved; a line joining the center of its base and its extremity makes an angle of 45 degrees with the longitudinal axis of the body; anterior margin straight in the lower three-fourth, then rather strongly curved backward; the concavity of the posterior margin forms an arc of a circle. Pectoral fins broad at the base. Beak stout; the depth of the jaws taken together, at the middle, about one-third greater than their breadth; length of beak about one-seventeenth the total length.

Back, head, margin of lower jaw, fins, and tail dark purplish gray which becomes lighter on the sides and shades into the white of the lower half of the same and of the belly. Dark-colored upper half of the body and the fins spotted with white or light gray; light-colored lower half of the body with prominent oblong spots of dark gray. Largest spots about 18^{mm} long.

Teeth $\frac{37}{34}$. Skull very similar to that of *P. doris*, but larger (total length 45.9^{cm}). (See p. 67.) Vertebræ: C. 7; D. 14; L. 19; Ca. 28–29= 68–69.

Measurements of the exterior.—(U. S. National Museum, No. 15030, ♂.) Total length, 84.9 inches (215.7^{cm}); length of mouth, 11 inches (28.0^{cm}); extremity of snout to dorsal fin, 13.3 inches (33.7^{cm}); length of pectoral fin, 11.9 inches (30.4^{cm}); vertical height of dorsal fin, 9.5 inches (24.1^{cm}); breadth of flukes, 20.7 inches (52.7^{cm}).

Measurements of the skull.—Total length, 45.9^{cm}; length of rostrum, 27.4^{cm}; breadth of rostrum at its base, 10.9^{cm}; at its middle, 5.8^{cm}; breadth, between orbits, 18.6^{cm}; length of temporal fossa, 8.4^{cm}.

Habitat.—Atlantic coast of United States; Cape Hatteras; Gulf of Mexico (*U. S. National Museum*).

PRODELPHINUS MALAYANUS (Lesson).

(Plate 16, figs. 1 and 2.)

Blowhole placed a little behind the line of the eyes, which are very small. Head large and rounded, very convex on the forehead, which slopes rapidly. A deep furrow at the base of the beak, which is narrow and elongated; lower jaw the longer. (Lesson.)*

Color, uniform ashy.

Skull.—(From Celebes. Identified with this species by Schlegel.) Teeth $\frac{39}{39}$. Skull like that of the type of *P. attenuatus* (Gray), but absolutely larger, with relatively longer beak and shorter tooth-row.

Measurements of the exterior.—(From Lesson.) Total length, 192.2^{cm}; height of dorsal fin, 21.6^{cm}; length of pectoral fin, 35.1^{cm}.

Measurements of the skull.—(Mus. Pays-Bas, No. 5. Identified with this species by Schlegel.) Total length, 42.5^{cm}; length of rostrum, 26.7^{cm}; breadth of rostrum at base, 9.2^{cm}; at its middle, 4.4^{cm}; breadth of intermaxillæ at same point, 2.1^{cm}; length of temporal fossa, 6.9^{cm}; depth of temporal fossa, 5.2^{cm}.

Habitat.—East Indies.

PRODELPHINUS ATTENUATUS (Gray).

(Plate 17, figs. 1 and 2.)

Color dark on the back, ashy-gray below. (Lütken).

Teeth, $\frac{35}{37}$ to $\frac{44}{43}$. Skull (*D. attenuatus*, Gray, type) closely resembles that of *P. malayanus*. Vertebræ: C. 7; D. 15; L. 21; Ca. 36–38= 79–81. (Lütken.)

Measurements of the exterior, ♀. (Lütken.) Total length, 69.1 inches (175.5^{cm}); length from extremity of snout to dorsal, 32.2 inches (81.9^{cm}); length from extremity of snout to pectoral, 15.9 inches (40.3^{cm}); length of snout, 4.6 inches (11.7^{cm}).

Measurements of the skull.—(347*b*. British Museum. Type of *P. attenuatus*.) Total length, 38.3^{cm}; length of rostrum, 23.9^{cm}; breadth of rostrum at base, 8.7^{cm}; at its middle, 3.8^{cm}; breadth between orbits, 14.7^{cm}; length of mandible, 32.9^{cm}.

Habitat.—Atlantic Ocean, near St. Paul Island (*Lütken*). Cape of Good Hope (*Gray*).

*One of the characters given by Lesson is as follows: "A strong carina, as in certain scombroid fishes, occupied the lateral and posterior parts of the body." The meaning of this is not clear.

PRODELPHINUS FRŒNATUS (F. Cuvier).

(Plate 19, figs. 1 and 2; plate 20, fig. 1.)

Smaller than *P. plagiodon*, which it resembles in coloration.

Color of the back and fins dark, sides lighter, belly white; sides marked with dark spots, the smaller of which are stellate. Dorsal and pectoral fins with small spots (Lütken).

1. ♀ Variety. Back dark greenish-gray, sharply separated from the white of the belly. A dark line from the snout to the pectoral fin, below which there are dark streaks and spots on the ground-color (Lütken).

2. ♀ Variety.—General form like that of *P. plagiodon*. "Dorsal fin high, rather acute at the tip. Black, sides with minute white specks; the sides of the body above the base of the pectoral to the base of the tail blackish gray, which color is obliquely extended as a lunate band from behind the vent to the back near the base of the tail." (Gray, *D. punctata*, Catalogue, p. 399.)

3. ♀ Young.—Form stout; dorsal fin triangular, in the middle of the back; pectoral fins long and narrow; flukes very broad.

Back black, which color becomes paler on the sides. Belly white as far as the middle of the tail. Head black above, ashy on the sides; a band of deeper tint extends from the corner of the mouth to beyond the eyes. (F. Cuv., *D. frœnatus*, Hist. nat. des Cétacés, p. 155.)

Teeth, $\frac{38}{37}$. Vertebræ: C. 7; D. 14; L. 16–18; Ca. 31–33=70. Skull like that of *P. plagiodon*, but smaller.

Measurements of the exterior (Lütken), ♂.—Total length, 73.7 inches (187.2^{cm}); extremity of snout to dorsal fin, 33.8 inches (85.8^{cm}); extremity of snout to pectoral fin, 15.4 inches (39^{cm}).

(*D. punctatus*, Gray, Catalogue, p. 299.) ♀. End of snout to tip of tail, 72 inches (182.9^{cm}); to blowhole, 12⅞ inches (32.7^{cm}); to eye, 12⅞ inches (32.7^{cm}); to dorsal fin, 32¼ inches (81.9^{cm}).

(*D. frœnatus*, F. Cuv., Hist. nat. des Cétacés, p. 156.) Total length, 57 inches (146.2^{cm}).

Measurements of the skull.—(No. *a*3033, Paris Museum. *P. frœnatus*, Type.) Total length, 37.6^{cm}; length of rostrum, 21.8^{cm}; breadth of rostrum at its base, 8.9^{cm}; at its middle, 5.2^{cm}; breadth between orbits, 16.4^{cm}; length of temporal fossa, 7.1^{cm}.

Habitat.—Atlantic Ocean; Indian Ocean; Cape Verde; St. Helena; Fernando Po (*Flower*); Madagascar.

PRODELPHINUS LONGIROSTRIS (Gray).

(Plate 20, fig. 2.)

Back and fins dark gray, with very small, irregular blotches of lighter gray. Belly white, with irregular, more or less stellate, spots of dark gray. (U. S. Nat. Mus.)

Vertebræ: C. 7; D. 14; L. 18; Ca. 34=73.

Teeth, $\frac{52}{52}$. Skull small. Rostrum very long (two thirds the total length), depressed and broad (at the middle about one-third the breadth at the orbits). Triangular area in front of nares short and only slightly depressed. Temporal fossæ very small and rounded, their length equal to the distance between the ante- and post-orbital processes of the frontal. Zygomatic process of squamosal short. Palate with traces of lateral grooves; vomer visible in the median line.

Measurements of the skull.—(No. 12, Mus. Pays-Bas. Type of *D. longirostris*, Gray.) Total length, 42^{cm}; length of rostrum, 28^{cm}; breadth of rostrum at base, 7.5^{cm}; at its middle, 4.6^{cm}; breadth between orbits, 14^{cm}; length of temporal fossa, 5^{cm}.

Habitat.—Cape of Good Hope (*type*); between Panama and the Galapagos Islands (*U. S. Nat. Mus.*); Australia (*Copenhagen Mus.*).

6. TURSIO Wagler.

Rostrum long, broad, tapering and flat. Rostral portion of intermaxillæ flat. Pterygoid bones separate, the inner margins parallel. Symphysis of mandible short. Teeth small, acute, and numerous, 43 to 44.

Head with a short, but distinct narrow beak (nearly in the same plane with the forehead in *L. peronii*). *No dorsal fin.* Pectoral fins falcate. Caudal ridges prominent. Color black above, white below, with sharply defined borders.

TURSIO PERONII (Lacépède).

(Plate 21, figs. 1 and 2.)

Body thickest about opposite the pectoral fin; from thence it tapers gradually to the flukes and rather abruptly toward the end of the beak. Beak short, and nearly in the same plane with the forehead. Lower jaw slightly longer than the upper. Pectoral fins and flukes shaped like those of *Delphinus delphis*.

Upper part of head, back, and flukes of a uniform black color. Lower half or third of sides, the snout, lower third of forehead and pectoral fins pure white. The two colors meet abruptly on the sides and do not commingle. A broad black spot on the upper posterior margin of the pectoral fins (Bennett); sometimes absent (?).

Teeth, $\frac{43}{43}$. Bones of skull thin and light. Rostrum broad and flat, extremity rounded off; the margins beveled in the distal half. Its length slightly exceeds one-half the total length. Its breadth at the middle exceeds one-fourth its length. Prenareal triangular area long and but slightly concave. Intermaxillæ not touching in the median line; most widely separated distally. Central part of mandibular symphysis raised above the level of the inferior margin of the mandible;

symphysis keeled. Projection of maxilla inclosing the maxillary notch externally rounded off.

Measurements of the exterior (from Lesson).—Total length, 71.8 inches (184.1^{cm}); length from extremity of snout to pectoral fin, 23.2 inches (59.5^{cm}); length of pectoral fin, 12.1 inches (31.1^{cm}); length of mouth, 10.6 inches (27.1^{cm}); breadth of flukes, 16.9 inches (43.3^{cm}).

Measurements of skull.—(3029, R. Coll. Surg. Tasmania.) Total length, 44^{cm}; length of rostrum, 11.2^{cm}; breadth of rostrum at its base, 6.1^{cm}; at its middle, 3.6^{cm}; length of temporal fossa, 6.9^{cm}; breadth between hinder margins of temporal fossæ, 16^{cm}.

Habitat.—Seas about Cape Horn; New Zealand; New Guinea (*Quoy*); Tasmania.

TURSIO BOREALIS (Peale).

(Plate 22, figs. 1 and 2.)

Form slender. Snout short, distinct. Flukes small. Lower jaw longer than the upper and curved upwards at the extremity.

Color black, except in the following regions, where it is white: Extremity of lower jaw; a large lozenge-shaped area between the pectoral fins and a line extending thence to the flukes. Lower side of flukes clouded with white. Eyes dark brown.

Teeth, $\frac{44}{47}$. Skull like that of *L. peronii*, but the mandible more slender and the symphysis of the same not keeled. The projection of the maxilla which bounds the maxillary notch externally pointed. Superorbital plate of maxilla and frontal bone very thin. Rostrum tapering distally to a sharp termination, its breadth at the middle somewhat less than one-fourth its length.

Measurements of the exterior.—(From Mr. Dall's MS. notes.) Total length, 97 inches (246.4^{cm}); distance from extremity of snout to pectoral fin, 25 inches (63.5^{cm}); length of pectoral fin (along anterior margin), 12 inches (30.5^{cm}); breadth of flukes, 16 inches (40.6^{cm}).

Measurements of the skull.—(National Museum, 8160. Cape Mendocino, Cal. ♀.) Total length, 43.7^{cm}; length of rostrum, 24^{cm}; breadth of rostrum at its base, 11^{cm}; at its middle, 5.6^{cm}; breadth between orbits, 17.6^{cm}; length of temporal fossa, 7.1^{cm}.

Habitat.—North Pacific Ocean; California (*Dall*); Japan (*Hilgendorf*).

7. LAGENORHYNCHUS Gray.

Rostrum large and broad. Rostral portion of intermaxillæ flat (somewhat convex in *obliquidens* and *electra*). Pterygoid bones in contact or separate. Symphysis of mandible short. Teeth variable in size, 22–45. Vertebræ, 73 to 92.

Head with a short, plowshare-like beak (not distinctly marked off [illegible]orehead in *obscurus*). Dorsal and pectoral fins moderate, fal[illegible]dges very prominent. Sides with two areas of light [illegible]y irregular, oblique dark bands.

LAGENORHYNCHUS ACUTUS Gray.

(Plate 23, figs. 1 and 2.)

Form stout; greatest girth of the body anterior to the middle of its length. Forehead gradually sloping; beak very short, a mere rim; a depression between it and the forehead on either side of the head; dorsal fin high and recurved, and attenuated in the distal half. Pectoral fins broad at the base, pointed. Flukes large; caudal ridges very strongly developed.

Upper jaw, forehead, back, and fins black; sides of head and body gray. On the upper part of the sides of the tail the gray color passes into dusky yellowish; lower down on the sides, below the dorsal fin, an oblong area of white. A narrow black band extends along the sides from the base of the flukes to about the line of the dorsal fin (? sometimes absent); another line of black extends from the base of the pectoral fins to a point between the eye and the corner of the mouth; the eye is surrounded by a circle of black, from which a line extends forward to the beak; the vent is in a small black area. The base of the flukes inferiorly and the adjacent margin of the tail are whitish. The margin of the lower jaw is sometimes black.

Teeth $\frac{35}{37}$. Vertebræ: C. 7, D. 15, L. 19, Ca. 39=80. Skull broad and massive; rostrum broad, its length one-half the total length of the skull. Proximal expanded portion of the maxillæ broad (breadth across post-orbital processes of frontal equal to length of rostrum). Premaxillæ flat, their outer margin sinuate. Temporal fossæ elongate and extending obliquely upward. Pterygoid bones in contact; large, with lateral keels and obtuse crests, the postero-internal free edge transverse and not strongly emarginate; vomer appearing in the center of the palate as a ridge about 5^{cm} long; it is joined by a linear slip of the intermaxillæ, which extends thence along the distal half of the palate to the extremity of the rostrum, becoming broader distally.

Measurements of the exterior (from Duguid).—Total length (along the back), 99 inches (251.5^{cm}); extremity of snout to pectoral fin, 16 inches (40.6^{cm}); to dorsal fin, 37 inches (93.9^{cm}); vertical depth of dorsal fin, 13 inches (33^{cm}); length of pectoral fins, 13 inches (33^{cm}); breadth of flukes, 25 inches (63.5^{cm}).

Measurements of the skull.—(U. S. National Museum, 14244, Cape Cod). Total length, 42.5^{cm}; length of rostrum, 21.6^{cm}; breadth of rostrum at base, 11.4^{cm}; at its middle, 7.6^{cm}; breadth between orbits, 21.6^{cm}; length of temporal fossa, 8.4^{cm};* depth of temporal fossa, 4.3^{cm}.

Habitat.—North Atlantic Ocean; North Sea; Faroe Islands; Greenland; coast of the United States, Cape Cod.

* Rather large; mean 7.9^{cm}.

LAGENORHYNCHUS FITZROYI (Waterhouse).

(Plate 24, fig. 1.)

Body anteriorly somewhat depressed, posteriorly compressed; head conical, arched above; the lower lip projecting beyond the upper; eye placed above and behind, but near the angle of the mouth; breathing-vent situated in the same line as the eyes, supposing a circle to be taken round the head.

Upper parts of the body black, under parts pure white, the two blended into each other by gray; extremity of snout, a ring around the eye, the edge of the under lip, and the tail-fin black; dorsal and pectoral fins dark gray; a broad gray mark extends from the angle of the mouth to the pectoral fin, above which the white runs through the eye and is blended into gray over the eye; two broad deep gray bands are extended in an oblique manner along each side of the body, running from the back downwards and backwards; iris of eye dark brown.

Teeth $\frac{20}{27}$, slightly curved and conical. (Waterhouse.)

Measurements of the exterior.—Total length (along curve of back), 5 feet 4 inches (162.6^{cm}); tip of muzzle to dorsal fin, 2 feet 6 inches 5 lines (77.3^{cm}); length of mouth, 7 inches 9 lines (19.7^{cm}); height of dorsal fin, 6 inches 4 lines (16.1^{cm}); length of pectoral fin (along anterior margin), 1 foot 2⅔ inches (37.3^{cm}); breadth of flukes, 1 foot 4 inches 5 lines (11.2^{cm}).

Habitat.—St. Joseph's Bay, Patagonia, lat. 42° 30′ S.

LAGENORHYNCHUS CRUCIGER (d'Orbigny and Gervais).

(Plate 25, figs. 1 and 2.)

Beak short, only slightly marked off from the convexity of the forehead.

Muzzle to the corner of the mouth, forehead, back, dorsal fin, tail and pectoral fins black. On the sides, from the eye and base of the pectoral fins to the tail, a broad black band. This band is broadest above the base of the pectoral fin, and decreases in width posteriorly until a point about opposite the anus is reached, after which it again increases in width and joins the black of the tail. Between the median and lateral black bands and on the belly the color is white, more or less pure. (D'Orbigny and Gervais.)

Teeth $\frac{28}{28}$, skull smaller than that of *L. acutus*, but similar in proportions. Rostral portion of premaxillæ flat, not twisted into a vertical position at the distal extremity; their outer margins straight; triangular area high, flat, and smooth; temporal fossæ moderate, oval, directed backwards; pterygoid bones in contact in the median line, moderate, very short antero-posteriorly, not keeled laterally; the conjoint postero-internal free margin transverse, as in *L. acutus;* vomer extending along urths of the rostrum, appearing on the palate as a narrow ridge.

Measurements of the skull.—(Mus. d'Hist. Nat., Paris. No. a 3045. Type.) Total length, 34.9cm; length of rostrum, 17.8cm; breadth of rostrum at the base, 10.7cm; at its middle, 6.6cm; breadth of intermaxillæ at same point, 4.1cm; breadth between orbits, 17.1cm; length of temporal fossa, 6.9cm; depth of temporal fossa, 4.1cm.

Habitat.—Seas south of Cape Horn; Pacific Ocean.

LAGENORHYNCHUS SUPERCILIOSUS (Schlegel).

(Plate 25, fig. 3.)

Teeth $\frac{29}{30}$. Vertebræ: C. 7, D. 13, L. 20, Ca. 33=73. Skull similar to that of *L. obliquidens*, but smaller. Pterygoid bones (apparently) in contact in the median line. Intermaxillæ not broad proximally, flat in the rostral portion; outer margins wavy. Length of rostrum exceeding one-half the total length of the skull (54.5 per cent). Temporal fossæ moderate, elliptical, directed obliquely upwards.

In the skeleton the neural arches become obsolete at the sixtieth vertebra; the transverse processes become obsolete at the fifty-fifth vertebra.*

Measurements of the skull.—(Mus. Pays-Bas. No. 40.) Total length, 35.6cm; length of rostrum, 19.4cm; breadth of rostrum at base, 8.5cm; at the middle, 5.4cm; breadth of intermaxillæ at same point, 3.2cm; breadth between orbits, 14.0cm; length of temporal fossa, 6.8cm; depth of temporal fossa, 4.5cm.

Habitat.—Cape of Good Hope.

LAGENORHYNCHUS ALBIROSTRIS Gray.

(Plate 26, figs. 1 and 2.)

Form like that of *L. acutus*, but with more swollen forehead, more attenuated and more strongly reclined dorsal fin and larger pectoral fins.

Forehead (except its base), back, and fins, black; sides, grayish black; belly, white. Base of forehead, beak, and mandible white, more or less tinged and shaded with gray. Three irregular areas of white on each side, one of which is above the base of the pectoral fin, the second below the insertion of the anterior margin of the dorsal fin, and the third below the insertion of the posterior margin of the same; all considera-

* As stated on page 92, Schlegel identifies this species with Lesson and Garnot's *D. superciliosus*, but the reasons for so doing are not apparent to the writer. Lesson and Garnot's description of the exterior of their animal is substantially as follows: Length 4 feet 2 inches (French); 30 teeth in the upper pair, 29 in the lower. Back, head, and muzzle black. Dorsal (situated in the middle of the back), pectoral, and caudal brown. Sides and belly white like satin. A white band passes above the eye and extends to the forehead; a white blotch near the tail. (Zool. Voy. Coquille, I, pt. 1, 1826, p. 181.)

bly mottled with black, gray, and brown. A similar light area in the median line of the back behind the blow-hole and another on the tail, near the insertion of the flukes; under side of fluke grayish.

The light areas of the sides are sometimes indistinct, or absent.

Teeth $\frac{26}{26}$; Vertebræ: C. 7, D. 15(–16), L. 23(–24), Ca. 43(–45)=88 (–92). Skull similar to that of *L. acutus*. Rostrum short, broad, and pointed; its breadth at the base two-thirds its length. Intermaxillæ broad and flat, their outer margin convex. Temporal fossæ moderate, elliptical, not strongly directed upward.

Measurements of the exterior.—(♂, young. From Clark.) Total length, 65½ inches (166.4^{cm}); distance from extremity of snout to base of dorsal fin, 30 inches (76.2^{cm}); vertical height of dorsal fin, 6 inches (15.2^{cm}); length of pectoral fin, 12 inches (30.5^{cm}); breadth of flukes, 15 inches (38.1^{cm}).

Measurements of the skull.—(N. N. Mus. Sci. and Art, Edinburgh.) Total length, 46^{cm}; length of rostrum, 22.9^{cm}; breadth of same at base, 15.2^{cm}; at its middle, 8.7^{cm}; breadth between orbits, 23.5^{cm}; length of temporal fossa, 7.9^{cm}.

Habitat.—North Atlantic Ocean; Baltic Sea, Kiel (*Claudius*); North Sea; Irish Channel; Faröe Islands; Greenland (*Reinhardt*); Davis Strait (*Eschricht*).

LAGENORHYNCHUS OBLIQUIDENS Gill.

(Plate 27, figs. 1 and 2.)

In form, and also probably in coloration, nearly identical with *L. acutus*. "The animal is rather thick in proportion to its length; black above, with a strongly falcate dorsal. Below, white, to the edge of the patch passing from the lower lip below the pectorals and terminating a short distance behind the vent. A broad gray smouch on each side above the line of the black color, and interrupted about the middle of the animal on each side; the edges of the gray are ill-defined. The posterior edges of the pectorals and dorsal are also grayish." (Dall.)

"Greenish black on the upper surface, lightened on the sides with broad longitudinal stripes of white, gray, and dull black, which in most examples run into each other, but below it is of a pearly or snowy white. The posterior edge of the dorsal fin is tipped with dull white or gray, and sometimes the flukes are marked in the same manner." (Scammon.)

Teeth $\frac{31}{31}$. Vertebræ: C. 7, D. 13, L. 24, Ca. 30=74.

Skull similar in general appearance to that of *L. acutus*, but somewhat less broad in proportion to its length (the width between the orbits is less than the length of the rostrum.) Premaxillæ more or less rounded, their outer margins not strongly sinuate. Temporal fossæ large and rounded. Pterygoid bones not in contact in the median line, widely

divergent posteriorly; their postero-internal free margin sigmoid in outline. Vomer visible in the median line of the palate along almost the entire distal half of the same, being replaced by the interno-inferior edge of the intermaxillæ only at the extremity of the rostrum.

Measurements of the exterior.—(From Dall.) Total length, 87 inches (221^{cm}); breadth of flukes, 24 inches (61^{cm}); extremity of snout to anterior edge of dorsal fin, 36 inches (91.4^{cm}).

Measurements of the skull.—(U. S. National Museum, n. n., adult.) Total length, 41.3^{cm}; length of rostrum 20.9^{cm}; breadth of rostrum at base, 11.8^{cm}; at its middle, 8.1^{cm}; breadth between orbits, 19.2^{cm}; length of temporal fossa, 8.4^{cm}; depth of temporal fossa, 6.8^{cm}.

Habitat.—North Pacific Ocean; Monterey, California; Puget Sound (*U. S. Nat. Mus.*).

LAGENORHYNCHUS THICOLEA Gray.

(Plate 24, fig. 2.)

Teeth $\frac{45}{42}$. Rostrum long and narrow, its breadth at the middle about one-fourth its length; intermaxillæ flat and narrow; their combined breadth at the middle of the beak contained seven and a half times in the length of the beak. Temporal fossæ small and rounded. Margins of proximal half of rostrum thickened; the superior surface of the maxillæ in this part at a different angle from the plane of the distal half of the rostral part of the maxillæ, which looks downward and forward.

Measurements of the skull.—(British Museum, 934*a*. Type.) Total length, 37.5^{cm}; length of beak, 21^{cm}; breadth of beak at its base, 9.7^{cm}; at its middle, 5.3^{cm}; breadth of intermaxillæ at same point, 2.8^{cm}; breadth between orbits, 16.3^{cm}; length of temporal fossa, 5.6^{cm}.

Habitat.—? West coast of North America.

LAGENORHYNCHUS ELECTRA Gray.

(Plate 28, figs. 1 and 2.)

For exterior, see p. 102.

Teeth $\frac{23}{23}$. Skull massive; rostrum broad, long, and flat, its length always slightly exceeding one-half the total length of the skull. Intermaxillæ slightly convex on the rostrum, except in the distal third of the latter, where their outer moiety is flat; their outer margins are sinuate. Mesethmoid cartilage ossified in front of the nares to a point anterior to the maxillary notches, forming part of the superior surface of the skull. Temporal fossæ moderate and squarish; upper tooth-row short, about five-sevenths the length of the rostrum. Vomer appearing in the median line of the palate opposite the middle tooth of the upper tooth-row. Outline of combined postero-inferior free margins of pterygoid bones strongly concave. Rami of mandible deep in the proximal half and slender anteriorly; the region of the symphysis obviously deeper than

the part of the ramus which immediately succeeds it; aveolar border flat.

Measurements of the skull.—(British Museum, 359*a*. *L. electra*, Type.) Total length, 45.7^{cm}; length of rostrum, 24.35^{cm}; breadth of rostrum at base, 13.95^{cm}; at its middle, 9.2^{cm}; breadth of intermaxillæ at same point, 6.1^{cm}; breadth between orbits, 25.2^{cm}; length of temporal fossa, 9.4^{cm}; depth of temporal fossa, 5.5^{cm}.

Habitat.—Indian Ocean; tropical Pacific Ocean; Hawaii.

LAGENORHYNCHUS OBSCURUS (Gray).

(Plate 29, figs. 1 and 2.)

Form apparently like that of *L. acutus*, but the snout longer and narrower and not distinctly divided off from the head.

"Fins moderate and falcate; neck and belly white; a black band from the angle of the mouth to the pectoral fins; lateral oblique streaks of white; otherwise entirely black" (Gray).

Teeth, $\frac{32}{30}$. Skull similar to that of *L. obliquidens*, but smaller. Pterygoid bones in contact in the median line. Intermaxillæ broad proximally, more or less convex distally; outer margins straight. Length of rostrum slightly exceeding one-half the total length of the skull. Temporal fossæ moderate, elliptical; their length always exceeding the width of the beak at the middle.

Measurements of the exterior.—(British Museum, type skin, 41, 1733).* Total length, 65 inches (165.1^{cm}); extremity of snout to corner of mouth, 8.7 inches (22.1^{cm}); to base of pectoral fin, 16.5 inches (41.9^{cm}); to base of dorsal fin, 31.75 inches (80.6^{cm}); vertical height of dorsal fin, 7.5 inches (19^{cm}); length of pectoral fin, 11 inches (27.9^{cm}); breadth of flukes, 15.75 inches (40^{cm}).

Measurements of the skull.—(British Museum, 354 *a*.) Total length, 36.8^{cm}; length of rostrum, 20.1^{cm}; breadth of rostrum at base, 9.3^{cm}; at its middle, 6.1^{cm}; breadth of intermaxillæ at same point, 3.3^{cm}; breadth between orbits, 15.5^{cm}; length of temporal fossa, 6.7^{cm}; depth of temporal fossa, 4.8^{cm}.

Habitat.—Cape of Good Hope (*Gray*); Chili (*Flower*); New Zealand (*Hector*, ? another species).

8. SAGMATIAS Cope.

Rostrum moderate, broad and tapering. Rostral portion of intermaxillæ flat. Triangular area in front of superior nares elevated above the plane of the surrounding parts. Pterygoid bones short, scarcely or not touching in the median line. Teeth small, 32.

Exterior and skeleton not known.

*This mounted skin is very much warped from its original shape, and the measurements are, therefore, of doubtful value.

SAGMATIAS AMBLODON Cope.

(Plate 30, fig. 1.)

Only the skull known.

Beak one-half the length of the entire cranium, and one-half as broad at the base as long. Temporal fossæ large and rounded. Intermaxillæ flat; they occupy rather more than one-half the breadth of the beak at the middle. Pterygoids short, scarcely or not touching in the median line.

Teeth $\frac{32}{32}$ (much worn in the type, but probably originally conical and acutely pointed).

Measurements of the type-skull.—Total length, 37.2^{cm}; length of beak, 18.5^{cm}; breadth of beak at base, 9.7^{cm}; at its middle, 6.2^{cm}; length of tooth line, 15.7^{cm}; breadth between orbits, 16.7^{cm}; temporal fossæ, 7.9^{cm} × 6.1^{cm}.

Habitat unknown.

9. FERESA Gray.

Rostrum half the total length; very broad. Rostral portion of intermaxillæ flat; their inner margins separate throughout. Mandible deep between the angle and coronoid process, slender in the center of the rami and obtusely keeled at the symphysis. Teeth few and large, 11 to 12. Tooth-line extending along only the anterior two thirds of the rostrum.

Skeleton and exterior unknown.

FERESA INTERMEDIA Gray.

(Plate 30, fig. 2.)

Exterior unknown.

Teeth $\frac{11}{10}$ to $\frac{12}{13}$. Skull small but massive. Rostrum one-half the total length; very broad. Intermaxillæ moderately expanded proximally; very broad distally (they occupy rather more than two-thirds of the breadth of the rostrum at its middle); rostral portion flat (a wide space between their inner edges, in the median line of the rostrum, in which the vomer is visible nearly to the end of the rostrum). Superior nares small; the transverse diameter less than one-fourth the breadth across the orbits; narrowed antero-posteriorly by the sloping forward of the mesethenoid.

Teeth very large; upper tooth-line occupying only about two-thirds the length of the beak. Orbits short. Temporal fossæ moderate and squared. Mandible deep between the angle and coronoid process, slender opposite the middle of the tooth-line, and obtusely keeled at the symphysis, as in *Lagenorhynchus electra*.

Measurements of the skull.—(British Museum, 362*a*. Type of *F. inter-*

media.) Total length, 36.2cm; length of rostrum, 17.3cm; breadth of rostrum at base, 12cm; breadth of rostrum at middle, 8.9cm; breadth of intermaxillæ at same point, 6.1cm; breadth between orbits, 21.1cm; length of temporal fossa, 9.2cm; depth of temporal fossa, 7.3cm.

(British Museum, 1672*a*. Type of *F. attenuata.*) Total length, 35cm; length of rostrum, 16.8cm; breadth of rostrum at base, 10.7cm; breadth of rostrum at middle, 7.5cm; breadth of intermaxillæ at same point, 5.2cm; breadth between orbits, 20.1cm; length of temporal fossa, 8.4cm; depth of temporal fossa, 7.4cm.

Habitat.—South seas.

10. CEPHALORHYNCHUS Gray.

Skull small. Rostrum moderate, broad. Rostral portion of intermaxillæ flat; proximal end beveled off at the sides of the superior nares. Symphysis of mandible short. Frontal plates of maxillæ nearly in one and the same plane. Pterygoid bones separate. Teeth small, acute, 25 to 31. Vertebræ, 63 to 65.

Size small. Head conical. Beak not marked off from the forehead. Dorsal fin triangular or ovate. Pectoral fins elliptical (falcate in *albifrons*). Black above, white below; the white of the belly forms a trident-shaped area posteriorly, the lateral tines of which extend upward obliquely on the sides.

CEPHALORHYNCHUS HEAVISIDEI Gray.

(Plate 31, figs. 1 and 2.)

General form like that of *Phocæna.* Mouth small. Pectoral fins elliptical. Dorsal fin triangular. Back, head, tail, and fins black. A large, sharply-defined area of white or pale yellow on the ventral surface of the body, extending from the breast to the vent; expanding posteriorly to form a trident, the lateral tines of which extend backward obliquely on the sides; expanding also anteriorly on the breast and upward behind the base of the pectoral fins.

Teeth $\frac{25}{25}$ to $\frac{30}{30}$. Vertebræ: C. 7; D. 13; L. 15; Ca. 30=65. Skull small. Rostrum rather less than one-half as long as the entire skull; broad and with an obtuse termination. Intermaxillæ only slightly expanded proximally, flat distally. Pterygoid bones short and widely separated. Vomer extending nearly to the extremity of the rostrum. Temporal fossæ moderate, rounded, longer than deep.

Measurements of the exterior.—(British Museum. Type-skin, mounted.) Total length, 109.2cm; extremity of snout to corner of mouth, 15.5cm; to base of pectoral fin, 26.7cm; to base of dorsal fin, 51.6cm; ver- height of dorsal fin, 8.2cm; length of pectoral fin, 14.5cm; breadth es, 24.7cm.

surements of the skull.—(Mus. d'Hist. nat., Paris, *a*3061). Total

length, 29.2cm; length of rostrum, 14cm; breadth of rostrum at its base, 7.1cm; at its middle, 5.1cm; breadth of intermaxillæ at same point, 2.8cm; breadth between orbits, 13cm; length of temporal fossa, 6.6cm; depth of temporal fossa, 4.8cm.

Habitat.—Cape of Good Hope.

CEPHALORHYNCHUS ALBIFRONS True.

(Plate 32, figs. 1 and 2.)

Like *C. heavisidei*, but somewhat larger. Dorsal fin low and ovate. Pectoral fins falcate, equal in length to the base of the dorsal. Caudal lobes narrow and directed backwards; deeply emarginate behind.

Nose and forehead pure white, bounded by a crescent of black behind the blowhole, sharply defined in front, but shading off behind to light gray, which is the uniform color of the upper surface of the body. Fins are all darker than the trunk; there is also pure black round the blowhole, cloaca, and vent. The white of the snout extends behind the eye, but the dusky color extends forward beneath the angle of the mouth. The lower aspect is white as far back as the vent, but is crossed by an isthmus of dark gray beneath the pectorals. The white band is continued by two lateral stripes that ascend on the flanks. (Hector.)

Teeth $\frac{31}{31}$. The skull resembles that of *C. heavisidei*, but the rostrum equals one-half the total length, and the pterygoid bones are long and constricted at the base. Length of adult skull, 14 inches.

Measurements of the exterior. (Hector.)—Total length, 51 inches (129.5cm); extremity of snout to dorsal fin, 24 inches (60.9cm); to pectoral fin, 12 inches (30.5cm); length of base of dorsal fin, 8 inches (20.3cm); breadth of flukes, 15 inches (38.1cm).

Habitat.—New Zealand (*Hector*).

CEPHALORHYNCHUS HECTORI (Van Beneden).

(Plate 33, fig. 1.)

Head conical, elongated; the snout only indistinctly marked off from the forehead. Pectoral fins linear, obtusely pointed. Dorsal fin low, ovate, strongly reclined. Caudal lobes narrow and strongly directed backwards.

Snout, forehead, back, sides, and fins dark gray or black, the latter color most pronounced on the sides. A broad transverse band of gray between the pectoral fins, which is abruptly joined posteriorly by a broad white longitudinal band which extends along the median line of the belly to the vent, behind which it breaks up into a trident-shaped area, the central tine of which continues along the median line of the belly nearly to the flukes, while the lateral tines pass obliquely upward and backward on the sides.

Teeth $\frac{30}{27}$. Vertebræ, C. 7; D. 14; L. 15; Ca. 27=63. Skull like that of *C. heavisidei*, but the pterygoid region contracted at the base; the palatine and pterygoid bones long.

Habitat.—New Zealand.

CEPHALORHYNCHUS EUTROPIA (Gray).

(Plate 33, fig. 2.)

Exterior unknown.

Teeth, $\frac{30}{31}$. Skull larger than that of *C. heavisidei*, which it closely resembles. Length of rostrum exceeding one-half the total length of the skull. Pterygoid bones long, not widely separated in the median line, their inner free margins parallel in the proximal half. Vomer terminating near the middle of the rostrum. Temporal fossæ moderate, squared, *i. e.*, about as deep as long.

Measurements of the skull.—(U. S. National Museum, No. 21167. ?Chili.) Total length, 34.3^{cm}; length of rostrum, 18.7^{cm}; breadth of rostrum at the base, 7.6^{cm}; at its middle, 6.1^{cm}; breadth of the intermaxillæ at the same point, 2.5^{cm}; breadth between orbits, 13.9^{cm}; length of temporal fossa, 6.7^{cm}; depth of temporal fossa, 5.6^{cm}.

Habitat.—Coast of Chili.

11. NEOMERIS Gray.

External and cranial characters like *Phocæna*, but the dorsal fin absent, being replaced by a number rows of small rounded tubercles. Teeth, $\frac{18}{15}$ to $\frac{19}{19}$. Vertebræ, 63. Color black.

NEOMERIS PHOCÆNOIDES (Cuvier).

(Plate 34, figs. 1 and 2.)

Snout rounded; head very convex, rising posteriorly high to the dorsal surface. Back with a longitudinal band of spinous tubercles on the vertebral area, beginning nearly opposite the root of the pectoral, widening to 1.5 inches about the middle, and again contracting and ending narrowly opposite or in line with the vent. No dorsal fin. Pectoral subfalcate. (Murray.)

Color black throughout, except that there is a purplish-red patch on the upper lip and one on the throat (? sometimes absent).

Teeth, $\frac{18}{17}$. Vertebræ, 63. Skull small. Rostrum very short and broad; its length about one-third the total length of the skull, and its breadth about equal to its length.* Intermaxillæ very broad distally, little, or not at all expanded proximally; very high in front of the nares. Vomer visible on the palate near the extremity of the rostrum.

* The rostrum is longer and narrower in Schlegel's specimen from Japan.

Pterygoid bones very short and widely separated. Temporal fossæ much longer than deep.

Measurements of the exterior (from Murray, *N. kurrachiensis*).—Total length 45 inches (114.3^{cm}) [along the curves, 52 inches]; extremity of snout to pectoral fin, 10 inches (25.4^{cm}); breadth of flukes, 9 inches (22.9^{cm}).

Measurements of the skull.—(Mus. d'Hist. nat., Paris, *a*3086, type of *N. phocænoides.*) Total length, 18.8^{cm}; length of rostrum, 6.2^{cm}; breadth of rostrum at base, 6.6^{cm}; at the middle, 4.3^{cm}; breadth of intermaxillæ at the same point, 2.5^{cm}; breadth between orbits, 10.4^{cm}; length of temporal fossa, 5.6^{cm}.

Habitat.—Japan; India; Cape of Good Hope.

12. PHOCÆNA Cuvier.

Skull small. Rostrum short and broad. Pterygoid bones small and widely separated. Proximal end of intermaxillæ raised into irregular bosses in front of the nares; rostral portion flat. Symphysis of mandible short. Teeth peculiar; small, compressed, spade-like; the crowns entire or divided into two or three lobes; 16 to 26 in number. Vertebræ, 64 to 98.

Size small. Head conical, not beaked (prolonged into an indistinct beak in *spinipinnis*). Dorsal fin triangular, small (attenuated, strongly reclined in *spinipinnis*); anterior margin sometimes furnished with a number of tubercles or blunt spines. Pectoral fins ovate (falcate in *spinipinnis*). Color never in spots.

PHOCÆNA COMMUNIS Lesson.

(Plate 35, figs. 1 and 2.)

Head sloping; jaws equal in length; mouth longer than one-half the pectoral fin.

Body fusiform, slender. Dorsal fin beginning somewhat in front of the middle of the length, triangular; its anterior margin nearly straight; its posterior margin concave; its vertical height equal to or less than the length of the mouth; the anterior margin sometimes with a row of small tubercles. Pectoral fins irregularly ovate, obtusely pointed. Flukes broad antero-posteriorly.

Head, back, dorsal, pectoral, and caudal fins, and (usually) the margin of the lower jaw dark slate-color or blackish. Sides lighter, the dark color fading gradually and irregularly into the white belly. Sides sometimes tinged with pink or yellowish. The dark color of the margin of the lower jaw often extends backward as an irregular broad band reaching half way to the pectoral. A narrow dark line also extends from the corner of the mouth to the anterior base of the pectoral fin.

Teeth, $\frac{26}{26}$. Vertebræ, C. 7; D. 12 or 13; L. and Ca. 44 to 47; total, 64 to 67.

Rostrum thick, obtusely pointed; its margins shelving; its length between 40 and 47 per cent. of the total length of the skull, and never surpassing the breadth at the orbits. Depth of the temporal fossa contained about two and one-half times in the tooth-line. The latter equal to or more than one-third the length of the skull.

Measurements of the exterior.—(♀ adult.) Total length, 68 inches (172.7cm); length of mouth, 4.75 inches (12.1cm); tip of snout to dorsal fin, 29 inches (73.7cm); length of pectoral fin, 7 inches (17.8cm); vertical height of dorsal fin, 4 inches (10.2cm; breadth of flukes, 12.5 inches (31.7cm).

Measurements of the skull.—Total length, 29.3cm; length of rostrum, 13.7cm; breadth of beak at base, 8.5cm; breadth of the same at its middle, 5.5cm; breadth between orbits, 13.7cm; length of temporal fossa, 6.0cm; height of crown of largest tooth, .

Habitat.—North Atlantic and North Pacific Oceans; North Sea; coast of Europe; Davis Strait to 67° or 69° north latitude (*Brown*); coast of the United States, Maine to New Jersey; Alaska, Glacier Bay; Puget Sound; Mexico, Banderas Bay (*Scammon*). (Ascends rivers.)

PHOCÆNA SPINIPINNIS Burmeister.

(Plate 36, figs. 1 and 2.)

Body fusiform, stout. Head rounded, with a short, not well-defined beak. Lower jaw longer than the upper. Dorsal fin narrow, reclining, the anterior margin concave and furnished with numerous rugosities, the posterior margin convex. Pectoral fins falcate. Superior and inferior margins of the tail raised into ridges.

Teeth $\frac{16}{17}$ thick. Mouth less than one-third the length of the pectoral fin. Dorsal fin commencing below the middle of the length of the body.

Color black throughout.

Proportions of skull nearly as in *P. communis*, but the tooth-line less than two-thirds the length of the beak.

Measurements of the exterior.—Total length (of the young type; after Burmeister), 64.8 inches (162cm); length of mouth, 3.4 inches (8.5cm); tip of snout to dorsal fin, 36 inches (90cm); length of pectoral fin, 10.4 inches (26cm); height of dorsal fin, 5 inches (12.5cm); breadth of flukes, 15.6 inches (39cm).

Measurements of the skull.—Total length, 29cm; length of beak (to root 12.2cm; breadth of beak at base, 8.0cm; at the middle, 5.5cm; ween postorbital processes of frontal, 16.2cm; length of tooth-

PHOCÆNA DALLII True.

(Plate 37, figs. 1 and 2.)

Head sloping. Lower jaw protruding slightly beyond the upper. Mouth short. Dorsal fin beginning a little behind the juncture of the first and second thirds of the total length; moderately high and falcate, its front edge furnished with faintly-marked tubercles. Pectorals as in *P. communis*. Dorsal and ventral margins of the body, between the vent and the origin of the flukes, raised into prominent thin ridges.

General color black. A cordate area of white occupies the belly and lower half of the sides, from a point in a line with the anterior margin of the dorsal fin to one considerably behind the vent. This area is faintly streaked with very fine dark lines, especially numerous near the median line, but only visible on close inspection. The dorsal fin is tipped with white. Eye blackish.

Teeth $\frac{23}{27}$, very small. Vertebral: C. 7; D. 14 (or 15); L. 27; Ca. 49=97 (or 98).

Skull as in *P. communis*, but the beak relatively shorter and flat, and the temporal fossæ smaller. The maxillaries also shorter proximally, and the mandible less deep between the coronoid process and angle. Nares very large. All the cervicals united, as are also the last four caudals. First thirty caudals with chevron bones. Formula of phalanges as follows: I, 1; II, 6; III, 4; IV, 2. The two distal phalanges of fingers 2 and 3 and the outermost of finger 4 very imperfectly ossified.

Measurements of the exterior.— ♂ adult (type). Total length, 72 inches (182.9^{cm}); length of mouth, 3.5 inches (8.8^{cm}); length from tip of snout to beginning of dorsal, 27.5 inches (69.8^{cm}); length of pectoral (anterior margin), 8 inches (20.3^{cm}); vertical height of dorsal, 6 inches (15.2^{cm}); breadth of flukes, 18.5 inches (47^{cm}).

Measurements of the skull.— ♂ adult (type). Total length, 33.3^{cm}; length of beak, 14^{cm}; breadth of beak at base, 9.5^{cm}; at middle, 5.7^{cm}; breadth between orbits, 16.5^{cm}; length of tooth-line, 12.7^{cm}; depth of temporal fossa, 2.6^{cm}.

13. ORCELLA Gray.

Rostrum short and broad; rostral portion of intermaxillæ broad.

Pterygoids widely separated from each other. Symphysis of mandible short. Teeth 12 to 14; small, conical, and acute, occupying nearly the whole length of the rostrum. Vertebræ, 62 to 63.

Head globose; beak wanting. Dorsal fin small, falcate. Pectoral fins small, broad at the base, and obtusely pointed. Color slate-gray above, lighter below, with or without irregular streaks.

ORCELLA BREVIROSTRIS Owen.

(Plate 38, figs. 1 and 2.)

Head convex from the blow-hole to the upper lip. Pectoral fins triangular—one-half as broad as long. Dorsal fin rising in the center of the back, comparatively small, falcate, obtusely pointed. "The line of the back is sharp from this fin down to the tail. The ventral line is the same for some inches behind the anus."

"Color dark slaty-blue above, almost black; a little paler below, without any streaks or marks" (Anderson and Sterndale).

Length from snout to caudal notch about 7 feet.

Habitat.—Bay of Bengal; Vizagapatam; Singapore.

ORCELLA FLUMINALIS Anderson.

Like *O. brevirostris*, but with rather smaller, lower, and more falcate dorsal fin. Head less anteriorly bulging. Pectoral fins shorter and broader.

Color pale bluish above, white underneath, with numerous streaks, as in *Grampus griseus* (Anderson and Sterndale).

Length, 7 to 7½ feet.

Habitat.—Irawaddy River, Burmah, 300 to 900 miles from the sea.

14. GRAMPUS Gray.

Rostrum moderate, expanded in front of the maxillary notches, and tapering thence to an obtuse termination. Triangular area in front of the superior nares raised above the level of the surrounding bones, and convex. Rostral portion of the intermaxillæ broad and moderately rounded. Symphysis of mandible short. Pterygoid bones in contact. Teeth 2 to 7, in the mandible only, and confined to the region of the symphysis. Vertebrae, 68.

Head globose, with slightly protuberant lips; beak wanting; mouth oblique. Dorsal fin prominent and falcate. Pectoral fins rather narrow, elongated, and falcate. Color slate-gray, mottled, and very irregularly streaked.

GRAMPUS GRISEUS (Cuvier).

(Plate 39, figs. 1 and 2.)

General form somewhat similar to that of *Globicephalus*. Head globose, with a slight indication of a beak; mouth oblique; lower jaw shorter than the upper. Dorsal fin high and falcate; pectoral fins falcate, elongated. Flukes narrow antero-posteriorly.

Back, dorsal fin and flukes dark gray or blackish, more or less tinged with purple. Pectoral fins blackish and mottled with gray. Head ·erior half of body light gray, varied in hue and tinged with

yellow. Belly grayish white. Body marked with numerous and conspicuous light-colored, irregular, and unsymmetrically-placed striæ.

Young.—Dark gray above, grayish white below. Head whitish, strongly tinged with yellow. Side with five or more narrow, vertical, and nearly equidistant lines.

Teeth $\frac{0}{6}$ to $\frac{0}{14}$. Vertebræ: C. 7; D 12; L. 19; Ca. 30 = 68.

Skull massive. Rostrum expanded in front of the maxillary notches, obtusely pointed; its length one-half the entire length of the skull. Intermaxillæ moderately convex on the rostrum; the prenareal area *elevated;* the spaces between the inner free margin become wider rather suddenly near the extremity of the rostrum. Vomer extending nearly to the extremity of the rostrum, not usually visible on the palate. Pterygoids large and prominent; largely in contact in the median line. Temporal fossæ oval, their wall largely covered by the squamosal.

Measurements of the exterior.—Adult ♀. Total length, 126 inches (320^{cm}; length of mouth, 10½ inches (26.7^{cm}); tip of snout to anterior base of dorsal fin, 47 inches; length of pectoral fin, 23¾ inches; vertical height of dorsal fin, 16 inches; breadth of flukes, 29 inches.

Measurements of the skull.—(U. S. National Museum, No. 15890. Adult. Cape Cod, Massachusetts.) Total length, 53^{cm}; length of rostrum, 26^{cm}; breadth of rostrum at base, 20.5^{cm}; breadth of rostrum at its middle, 12.8^{cm}; breadth of intermaxillæ at same point, 9^{cm}; breadth between orbits, 34.2^{cm}; length of temporal fossa, 13.3^{cm}.

Habitat.—North Atlantic and North Pacific Oceans; North Sea; Mediterranean; coast of the United States, Cape Cod; Atlantic City, N. J.; Massachusetts; Cape of Good Hope (*G. richardsoni* Gray); California (*G. stearnsii* Dall); Japan (*G. sakamata* Gray).

15. GLOBICEPHALUS Gray.

Rostrum short and very broad. Rostral portion of intermaxillæ flat and very broad (sometimes covering the entire anterior half of the rostrum). Symphysis of mandible short. Pterygoid bones large and in contact. Teeth few and large, 7 to 11, confined to the anterior half of the rostrum. Vertebræ, 57 to 60.

Head globular, with a rounded protuberance on the lip; beak wanting; mouth oblique. Dorsal fin very long, low, and thick. Pectoral fins narrow and very long. Color black.

GLOBICEPHALUS MELAS (Traill).

(Plate 40, figs. 1 and 2.)

Size large; form stout. Head globose; forehead protuberant, overhanging the lip in adult individuals; body especially deep opposite the dorsal fin. Pectoral fins very long, slender, and pointed; length about

one-fifth the total length of the body. Dorsal fin on a long base and strongly recumbent, situated anterior to the middle of the length of the body. Caudal ridges prominent, extending respectively to the dorsal fin and to the vent. Flukes large and broad. Mouth oblique.

General color uniform black; a large hastate white area on the breast extending from the line of the corners of the mouth to the base of the pectoral fins; from behind this area a white band, which is much the broadest in the posterior half, extends backwards along the median line to the vent; the whole white area has the general form of an arrow with its head, shaft, and feathers.

Teeth $\frac{10}{10}$. Vertebræ: C. 7; D. 11; L. 13 (-14); Ca. 27(-29) = 58–60. Skull large and massive. Rostrum longer than broad at the base; its breadth at the base slightly less than three-fourths its length. Intermaxillæ large and flat; not greatly broader anteriorly than posteriorly; rugose in front; their outer margins not coinciding with the margins of the maxillæ except at the extremity of the rostrum; separated in the median line throughout. Superior nares broad transversely and bordered by narrow plates of the intermaxillæ. Vomer extending nearly to the extremity of the rostrum. Pterygoid bones large, obtusely keeled, and closely approximated in the median line. Temporal fossæ moderate, oval.

Measurements of the exterior (from Bell).—Total length, 182 inches (462.3^{cm}); extremity of snout to corner of mouth, 14.5 inches (36.8^{cm}); to dorsal fin, 55 inches (139.7^{cm}); length of pectoral fin along anterior edge, 50 inches (127^{cm}); greatest breadth of pectoral fin, 11 inches (27.9^{cm}).

Measurements of the skull.—(U. S. National Museum, No. 12100, Cape Cod, Massachusetts.) Total length, 655^{cm}; length of rostrum, 33.4^{cm}; breadth of rostrum at base, 24.1^{cm}; at its middle, 19.4^{cm}; breadth of intermaxillæ at same point, 15.4^{cm}; breadth between orbits, 42.3^{cm}; length of temporal fossa, 17.3^{cm}.

Habitat.—Atlantic coast of North America to New Jersey; coast of Europe; Cape of Good Hope; New Zealand.

GLOBICEPHALUS BRACHYPTERUS Cope.

(Plate 41, fig. 1.)

In form and size like *G. melas*. Pectoral fins shorter, their length about one-sixth the total length of the body, or less. Dorsal fin situated far forward, usually at the juncture of the anterior and second fourths of the length of the body.

Color entirely black.

Teeth, $\frac{8}{8}$. Vertebræ: C. 7; D. 11; L. 11; Ca. 28=57. Skull large massive. Intermaxillæ large and flat; greatly expanded anteriorly, covering the anterior half of the rostral part of the maxillæ and ecting over their margins. The distance from the maxillary notch

to the point of greatest enlargement of the intermaxillæ is contained about two and a half times in the length of the rostrum. Rostrum broad, its breadth at the base exceeding four-fifths its length. Temporal fossæ large and oval. Superior nares narrow transversely, and bordered laterally by broad plates of the intermaxillæ. Pterygoids as in *G. melas*, not strongly adpressed; the sinus wide as well as deep.

Measurements of the exterior.—(♂. Dam Neck Mills, Va.) Total length, 183 inches (464.8cm); tip of snout to dorsal fin, 47.5 inches (120.6cm); to base of pectoral fin, 36 inches (91.4cm); length of pectoral fin, 30 inches (76.2cm); vertical height of dorsal fin, 14 inches (35.6cm); breadth of flukes, 46 inches (116.8cm).

Measurements of the skull.—(U. S. National Museum. ♂. No. 22561. Dam Neck Mills, Va.) Total length, 66.2cm; length of rostrum, 33.3cm; breadth of rostrum at base, 28.8cm; at its middle, 23.5cm; breadth of intermaxillæ at same point, 22.9cm; breadth between orbits, 45cm; length of temporal fossa, 16.3cm.

Habitat.—Atlantic coast of North America, from New Jersey to the Gulf of Mexico and the West Indies.

GLOBICEPHALUS SCAMMONI Cope.

(Plate 42, figs. 1 and 2.)

Size and form of *G. brachypterus*. Pectoral fins proportionally a little longer.

Color entirely black.

Teeth, $\frac{8}{8}$. Skull large and very massive. Rostrum broad, its breadth at the base about four-fifths its length. Intermaxillæ flat, except in front; greatly expanded distally, covering the anterior half of the rostral portion of the maxillæ, but not projecting over their lateral margins. The greatest expansion of the intermaxillæ is opposite the junction of the proximal and second fourths of the longitudinal axis of the rostrum. Temporal fossæ oval and smaller than in *G. brachypterus*. Superior nares broad and bordered by narrow plates of the intermaxillæ; pterygoid bones closely approximated, short and strongly adpressed; the sinus deep, but narrow antero-posteriorly. Tubercles of the intermaxillæ very strong.

Measurements of the exterior.—(♂. From Scammon.) Total length, 186 inches (472.4cm); tip of snout to dorsal fin, 54 inches (137.2cm); to pectoral fin, 33 inches (83.8cm); length of pectoral fin, 34 inches (86.4cm); breadth of flukes, 42 inches (106.7cm).

Measurements of skull.—(U. S. National Museum, No. 9074.) Total length, 69cm; length of rostrum, 34cm; breadth of rostrum at base, 30.8cm; at its middle, 25.2cm; breadth of intermaxillæ at the same point, 23.6cm; breadth between orbits, 48.7cm; length of temporal fossa, 14.8cm.

Habitat.—North Pacific Ocean.

GLOBICEPHALUS SIEBOLDII Gray.

(Plate 43, figs. 1 and 2.)

Known only from a young individual.

Form and color as in *G. brachypterus*. Pectoral fins broad in the distal half, with irregular sinuate margins.

Teeth $\frac{10}{10}$. Vomer bifurcated at the extremity.

See page 142.

Habitat.—Japan.

GLOBICEPHALUS INDICUS Blyth.

See page 137.

Habitat.—India.

GLOBICEPHALUS MACRORHYNCHUS Gray.

See page 138.

Habitat.—South Seas.

16. PSEUDORCA Reinhardt.

Rostrum short and broad. Rostral portion of the intermaxillæ broad, equal to or exceeding the breadth of the proximal end; abruptly truncated at the distal end. Pterygoid bones short, nearly or quite in contact in the median line. Palatine bones prolonged laterally across the optic canal. Teeth few and large, with conical roots, 10. Vertebræ, 50.

Head globose, depressed; beak wanting. Dorsal and pectoral fins rather small, narrow, and falcate. Color uniform black.

PSEUDORCA CRASSIDENS (Owen).

(Plate 44, figs. 1 and 2.)

Size large. Body elongate. Head sloping gradually and gently from the blowhole to the extremity; no appearance of a beak. Dorsal fin in the middle of the length, narrow and upright, not higher (along the center) than the length of the pectoral fin. Pectoral fin small, one-third as broad as long; its length contained eight to nine times in the total length of the body.

Color uniform black.

Teeth $\frac{8}{10}$. Vertebræ: C. 7; D. 10; L. 9; Ca. 24=50.

Skull massive. Rostrum long and broad; its length about one-half the total length of the skull; its breadth at the base about two-thirds its length. Intermaxillæ broad and flat, not expanded proximally; their outer margins on opposite sides forming approximately parallel lines. Vomer extending forward to the junction of the distal and second thirds of the rostrum, not visible on the palate. Intermaxillæ ending back on the palate, nearly to the middle of the rostrum.

Pterygoid bones short and adpressed; not in contact in the median line. Temporal fossæ long and rectangular.

Measurements of the skull.—(Roy. Coll. Surg. London, No. 2985. Old. Tasmania.) Total length, 59.5cm;* length of rostrum, 28.7cm; breadth of rostrum at base, 20.8cm; at its middle, 18.8cm; breadth of intermaxillæ at same point, 13.2cm; breadth between orbits, 33.3cm; length of temporal fossa, 19.1cm.

Habitat.—Pelagic.

17. ORCA Gray.

Size very large. Rostrum broad and moderately elongated. Rostral portion of intermaxillæ narrow and flat. Pterygoid bones separate. Teeth few, 10 to 13; very large, with flattened roots. Vertebræ, 52.

Head conical and depressed; beak wanting. Dorsal fin large and prominent (remarkably so in the male). Pectoral fins large and very broadly ovate. Color black, with a large and sharply contrasted ventral area of white, forming a trident posteriorly, the lateral tines of which extend up on the sides.

ORCA GLADIATOR (Lacépède).

(Plate 45, figs. 1 and 2.)

Cranial characters of the genus.

Size very large. Head broad, conical, and depressed. Dorsal fin erect, extraordinarily high in the male. Pectoral fins short and broad.

Upper half of head, back, and fins black. Lower jaw, breast, and belly whitish. The white area forms a trident posteriorly, the central tine of which extends back to the vent, while the lateral tines extend obliquely upward and backward on the sides. A large white blotch behind the eye. A crescent-shaped area of purple extends across the median line of the back behind the dorsal fin (? sometimes obsolete).

Habitat.—Pelagic.

Subfamily II. DELPHINAPTERINÆ.

18. DELPHINAPTERUS Lacépède.

DELPHINAPTERUS LEUCAS (Pallas).

(Plate 46, figs. 1 and 2.)

Size moderate. Head globose, not prolonged into a snout. Neck marked by a slight constriction. No dorsal fin, the center of the back rising instead into a low, irregular ridge. Pectoral fins short, very broad across the center, and obtusely pointed.

Color white throughout.

* A little sawn off the end of the rostrum.

Teeth $\frac{9}{9}$, obliquely and often very irregularly implanted, and of varying size. Vertebræ: C. 7; D. 11; L. 9; Ca. 23=50.

Rostrum of skull rather less than half the total length; broad at the base, tapering rapidly to the middle, but with the margins of the distal half approximately parallel. Intermaxillæ broad and moderately convex, rarely extending backward to the posterior wall of the superior nares. Expanded proximal portion of maxillæ not bent upward as in other dolphins, so that the entire upper surface of the skull is nearly in one and the same plane. Pterygoid bones far apart at the base, converging toward the extremity but not meeting; the sinus of very small proportions.

Measurements of the exterior.—Total length, 137.5 inches; tip of snout to pectoral fin, 29 inches; length of pectoral fin, 16.5 inches; greatest breadth of pectoral fin, 10.5 inches; breadth of flukes,

Measurements of the skull.—(No. 2958, R. Coll. of Surgeons, London.) Total length, 55.3^{cm}; length of rostrum, 26.4^{cm}; breadth of rostrum at base, 18.3^{cm}; at its middle, 9.9^{cm}; breadth between orbits, 27.2^{cm}; length of temporal fossa, 15.2^{cm}.

Habitat.—Arctic and sub-Arctic seas; north to 81° 35′ (*Greely*), straggling southward to Firth of Forth, Scotland, and Cape Cod, Massachusetts.

19. MONODON Linné.

MONODON MONOCERAS Linné.

(Plate 47, figs. 1 and 2.)

Head short and rounded. Pectoral fins short and broad. Dorsal fin rudimentary; a low ridge.

Color above dark gray or dusky; below, white; sides and back mottled with gray.

Teeth in the form of two spirally-twisted tusks, which are usually concealed in the female; in the male the left tusk (rarely the right, or both) is greatly developed. Vertebræ: C. 7; D. 11; L. 6; Ca. 26=50. Cranial characters as in *Delphinapterus*.

Measurements of the exterior.—(From Fleming.) Total length, 144 inches; tip of snout to pectoral fin, 30 inches; length of pectoral fin, 15 inches; greatest breadth of pectoral fin, 6 inches.

Measurements of the skull.—(23455, U. S. Nat. Mus. ♀, with 2 tusks.) Total length, 54^{cm}; length of rostrum, 23.7^{cm}; breadth of rostrum at base, 22^{cm}; at its middle, 13.7^{cm}; breadth between orbits, 34.4^{cm}; length of temporal fossa, 15.2^{cm}.

Habitat.—Arctic seas.

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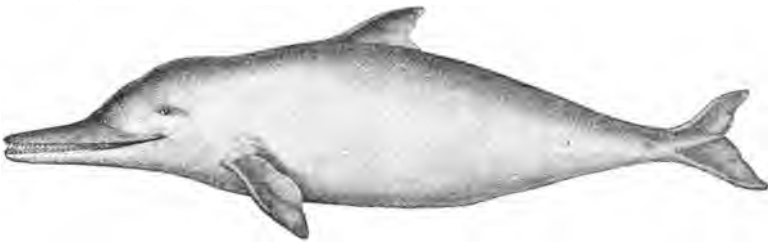

FIG. 1. *Sotalia plumbea* (Cuvier).

(After F. Cuvier.)

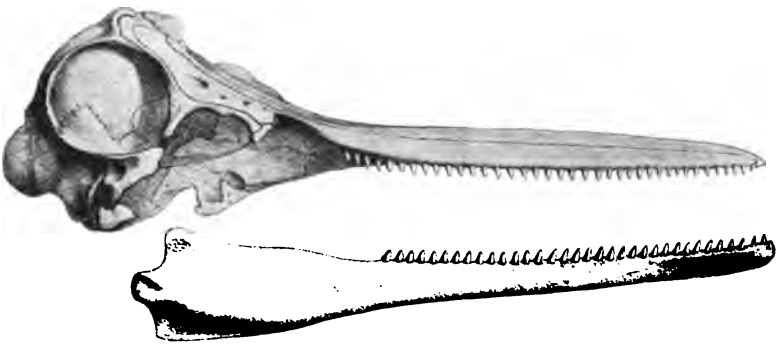

FIG. 2. *Sotalia plumbea* (Cuvier).

(From Van Beneden and Gervais, Ostéographie des Cétacés, 1868-'79, pl. 37, figs. 1 and 2.)

FIG. 3. CHINESE WHITE DOLPHIN.

Sotalia sinensis Flower.

(From Flower, Transactions of the Zoological Society of London, vii, pl. 17, fig. 2.)

GENUS SOTALIA.

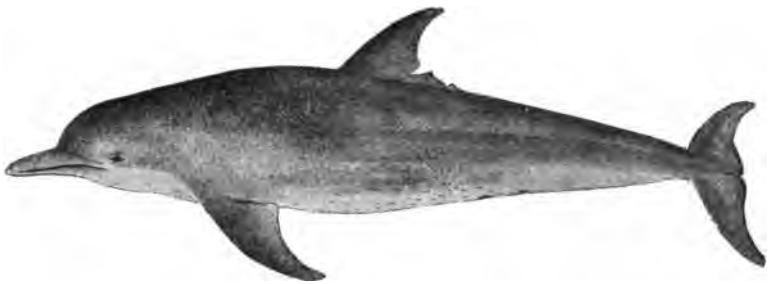

FIG. 1. *Sotalia gadamu* (Owen).

(From Owen, Transactions of the Zoological Society of London, vi, 1869, pl. 3, fig. 1.)

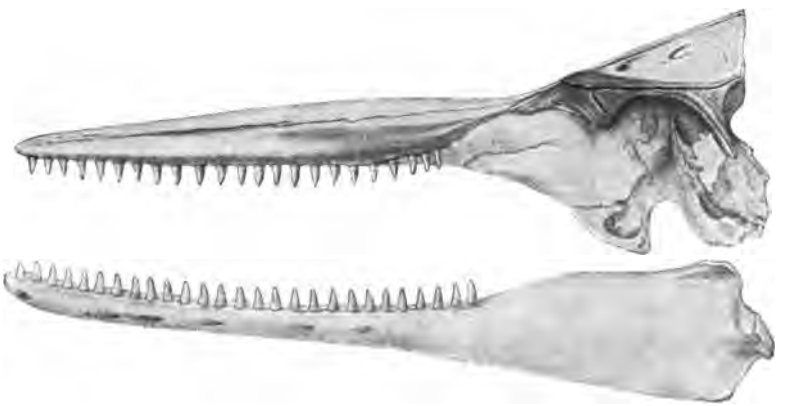

FIG. 2. *Sotalia gadamu* (Owen).

(From Owen, Transactions of the Zoological Society of London, vi, pl. 4, figs. 1–2.)

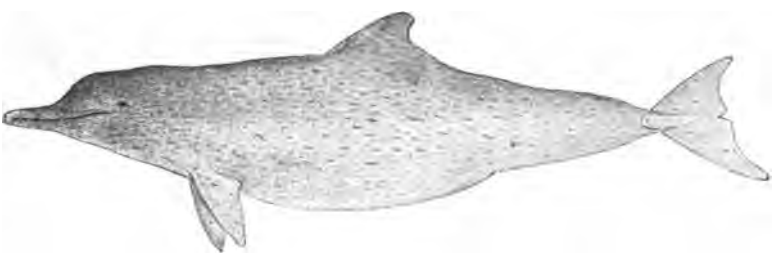

FIG. 3. *Sotalia lentiginosa* (Owen).

(From Owen, Transactions of the Zoological Society of London, vi, 1869, pl. 5, fig. 2.)

GENUS SOTALIA.

FIG. 1. *Sotalia brasiliensis* E. Van Beneden. Young.

(From E. Van Beneden, Mémoires de l'Académie Royale de Belgique, xli, 1874.)

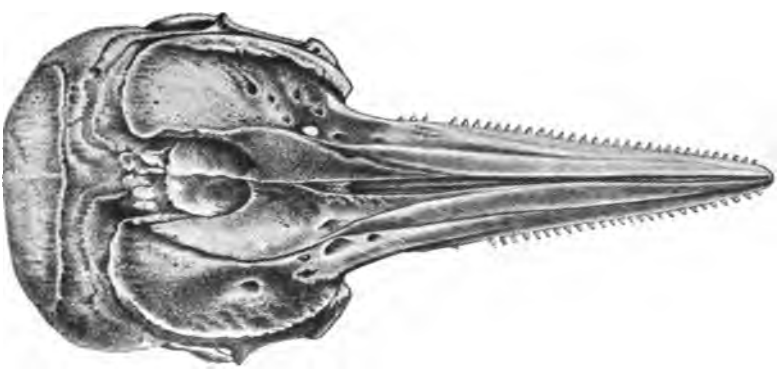

FIG. 2. *Sotalia brasiliensis* E. Van Beneden. Young.

(From E. Van Beneden, Mémoires de l'Académie Royale de Belgique, xli, 1874.)

GENUS SOTALIA.

FIG. 1. *Sotalia pallida* (Gervais).

(From Castelnau. Expédition dans l'Amérique du Sud, pt. 7, Zoologie, i, 1855, pl. 19, fig. 1.)

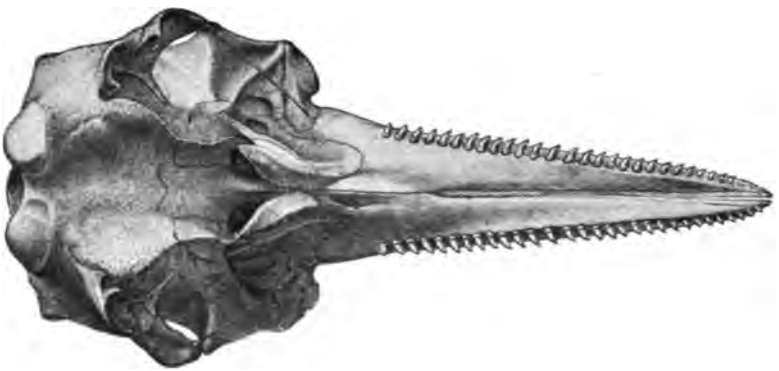

FIG. 2. *Sotalia pallida* (Gervais).

(From Van Beneden and Gervais, Ostéographie des Cétacés, 1868–'79, pl. 41, fig. 6*a*.)

GENUS SOTALIA.

FIG. 1. *Sotalia fluviatilis* (Gervais).

(From Castelnau, Expédition dans l'Amérique du Sud, pl. 7, Zoologie, 1855, pl. 9, fig. 1.)

FIG. 2. *Sotalia tucuxi* Gray.

(From a photograph of the type-skull, No. 1189*a*, ♂, in the British Museum.)

GENUS SOTALIA.

FIG. 1. *Steno rostratus* (Desmarest).

(From Lütken, K. Danske Videnskabs Selskabs Skrifter, 6te Række, v, 1889, pl. 1.)

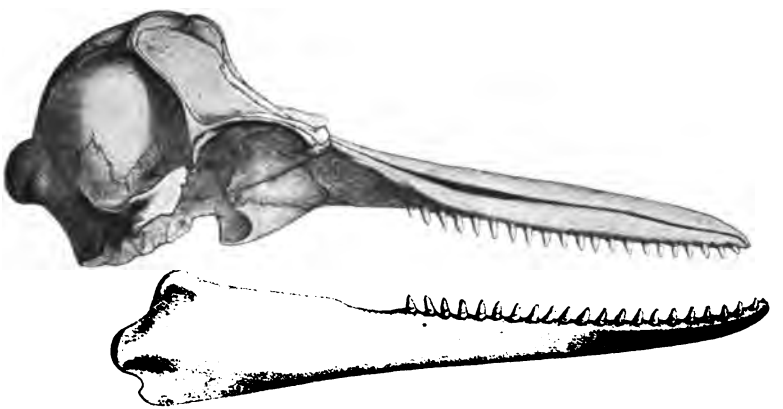

FIG. 2. *Steno rostratus* (Desmarest).

(From Van Beneden and Gervais, Ostéographie des Cétacés, 1868–'79, pl. 37, fig. 10.)

GENUS STENO.

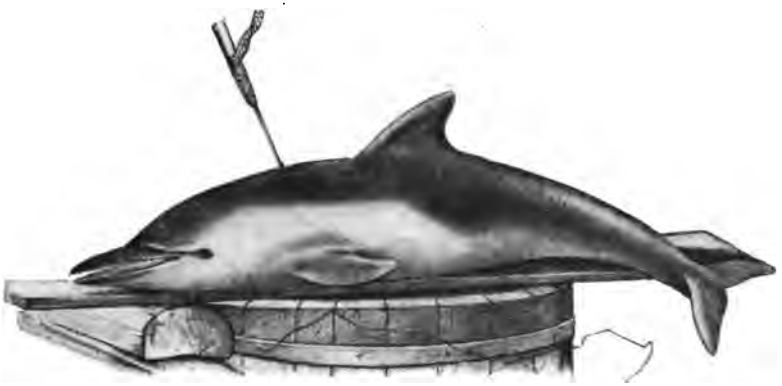

FIG. 1. *Steno perspicillatus* Peters.

(From Peters, Monatsbericht der k. Akademie der Wissenschaften. Berlin, 1876, pl. 2.)

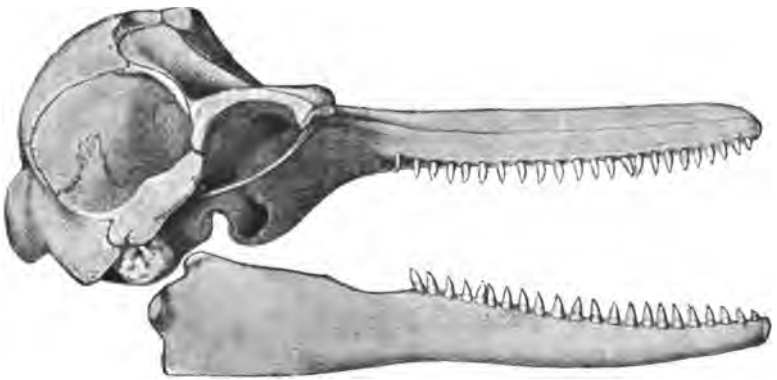

FIG. 2. *Steno perspicillatus* Peters.

(From Peters, Monatsbericht der k. Akademie der Wissenschaften, Berlin, 1876, pl. 13, fig. 1. Type-skull.)

GENUS STENO.

FIG. 1. COMMON PORPOISE; BOTTLENOSED DOLPHIN.

Tursiops tursio (Fabricius).

(From a photograph in the U. S. National Museum.)

FIG. 2. COMMON PORPOISE; BOTTLENOSED DOLPHIN.

Tursiops tursio (Fabricius).

(From Van Beneden and Gervais, Ostéographie des Cétacés, 1868–'79, pl. 34, fig. 3.)

GENUS TURSIOPS.

FIG. 1. *Tursiops abusalam* (Rüppell).

(From Rüppell, Museum Senckenburgianum, iii, 1845, pl. 12. fig. 1.)

FIG. 2. *Tursiops abusalam* (Rüppell).

(From Rüppell, Museum Senckenburgianum, iii, 1845, pl. 12, fig. 3.)

GENUS TURSIOPS.

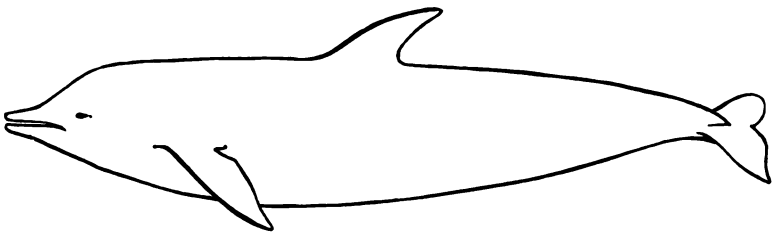

FIG. 1. *Tursiops gillii* Dall.

(From Scammon, Marine Mammalia, 1874, p. 102. Approximate outlines.)

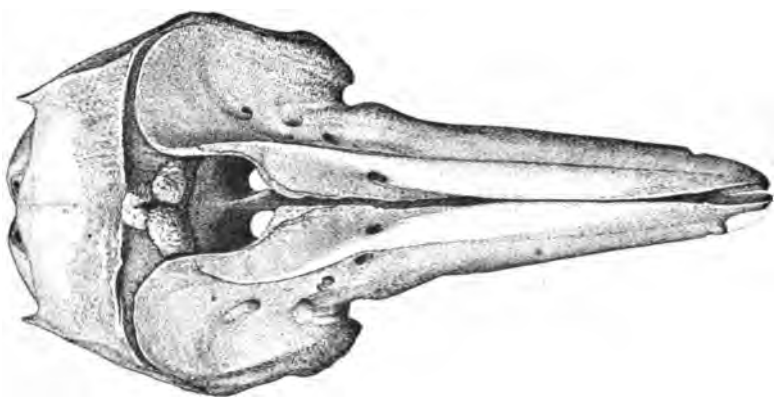

FIG. 2. *Tursiops gillii* Dall.

(From the type-skull, No 12054, in the U. S. National Museum.)

GENUS TURSIOPS.

FIG. 1. COMMON DOLPHIN.

Delphinus delphis Linné.

(From a sketch by J. H. Emerton.)

FIG. 2. COMMON DOLPHIN.

Delphinus delphis Linné.

(From Van Beneden and Gervais, Ostéographie des Cétacés, 1868–'79, pl. 39, fig. 3.)

FIG. 3. COMMON DOLPHIN.

Delphinus delphis Linné.

(From Van Beneden and Gervais, Ostéographie des Cétacés, 1868–'79, pl. 39, fig. 3.)

GENUS DELPHINUS.

FIG. 1. *Delphinus capensis* Gray.

(From Gray, Spicilegia Zoologica, 1828, pl. 2, fig. 1.)

FIG. 2. *Delphinus longirostris* Cuvier.

(From Van Beneden and Gervais, Ostéographie des Cétacés, 1868–'79, pl. 39, fig. 10.)

GENUS DELPHINUS.

FIG. 1. *Delphinus roseiventris* Wagner.

(From Jacquinot et Pucheran, Zoologie du Voyage de l'Astrolabe et Zélée, 1853, pl. 22, fig. 2.)

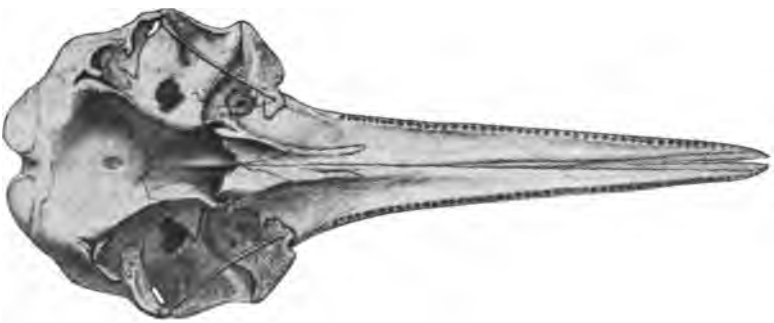

FIG. 2. *Delphinus roseiventris* Wagner.

(From Van Beneden and Gervais, Ostéographie des Cétacés, 1868–'79, pl. 38, fig. 6*a*.)

GENUS DELPHINUS.

FIG. 1. *Prodelphinus cæruleo-albus* (Meyen).

(From Meyen, Nova Acta Academiæ Cæsareæ Leopoldino-Carolinæ Naturæ Curiosum, xvi, 1832, pl. 43, fig. 2.)

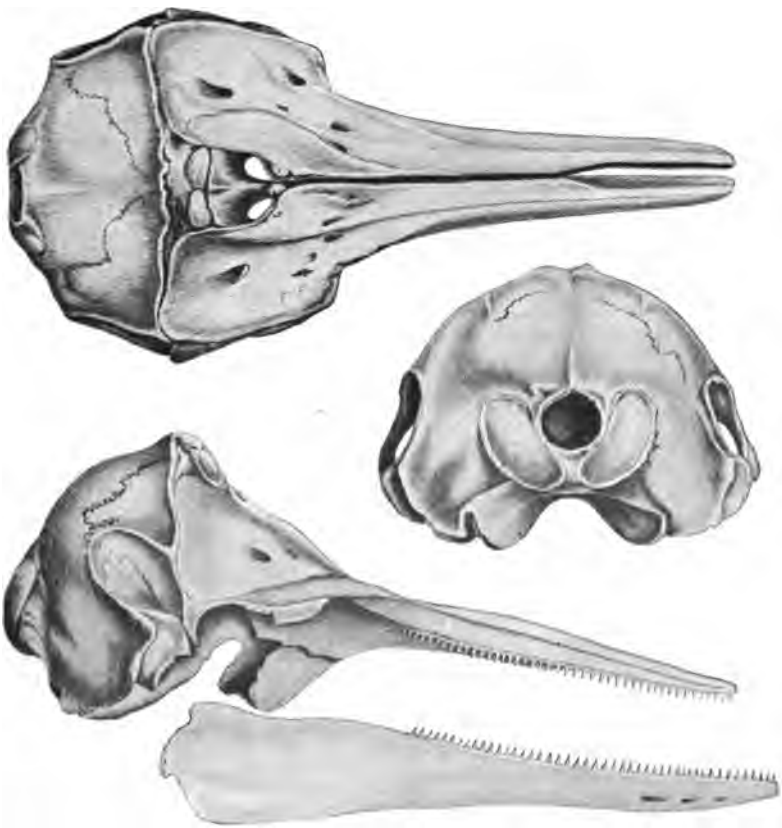

FIG. 2. *Prodelphinus cæruleo-albus* (Meyen).

(From Schreber's Säugethiere, pl. 364.)

GENUS PRODELPHINUS.

FIG. 1. *Prodelphinus euphrosyne* (Gray).

(From Pucheran, Revue et Magasin de Zoologie, 2d series, viii, 1856, pl. 25. *D. marginatus*.)

FIG. 2. *Prodelphinus euphrosyne* (Gray).

(From Gray, Synopsis of Whales and Dolphins, 1868, pl. 22.)

FIG. 3. *Prodelphinus* (?) *lateralis* (Peale).

(From Peale. U. S. Exploring Expedition, Mammalogy and Ornithology, Atlas, pl. 8, fig. 1.)

GENUS PRODELPHINUS.

FIG. 1. *Prodelphinus malayanus* (Lesson).

(From Jacquinot et Pucheran, Zoologie du Voyage de l'Astrolabe et Zélée, Mammifères et Oiseaux, Atlas, pl. 21, fig. 2. *Dauphin à petites pectorales.*)

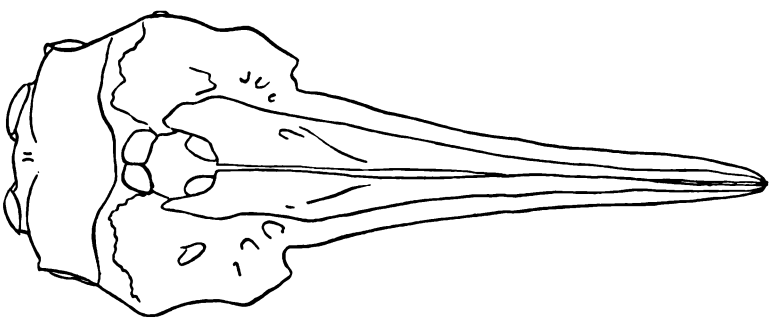

FIG. 2. *Prodelphinus malayanus* (Lesson).

(From Schlegel, Abhandlungen aus dem Gebiete der Zoologie, 1841, pl. 1, fig. 2.)

GENUS PRODELPHINUS.

FIG. 1 *Prodelphinus attenuatus* (Gray).

(From Gray. Catalogue of Whales and Dolphins, 1866, p. 399, fig. 101. *C. punctata*.)

FIG. 2. *Prodelphinus attenuatus* (Gray).

(From Gray, Synopsis of the Whales and Dolphins, 1868, pl. 28.)

GENUS PRODELPHINUS.

FIG. 1. SPOTTED DOLPHIN.

Prodelphinus plagiodon (Cope).

(From a photograph taken on board the U S. Fish Commission Steamer Albatross.)

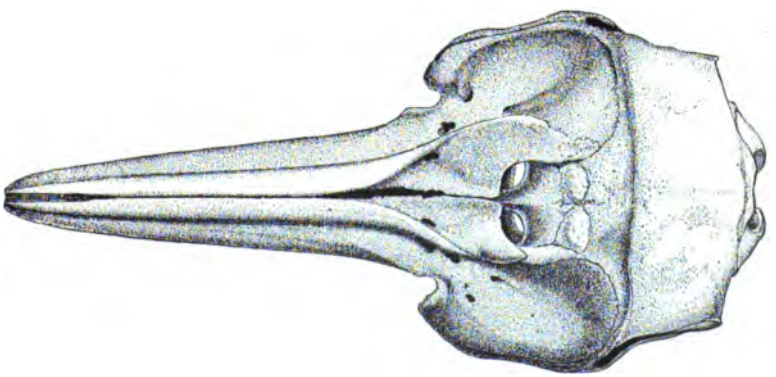

FIG. 2. SPOTTED DOLPHIN.

Prodelphinus plagiodon (Cope).

(From the type-skull, No. 3884, in the U. S. National Museum.)

GENUS PRODELPHINUS.

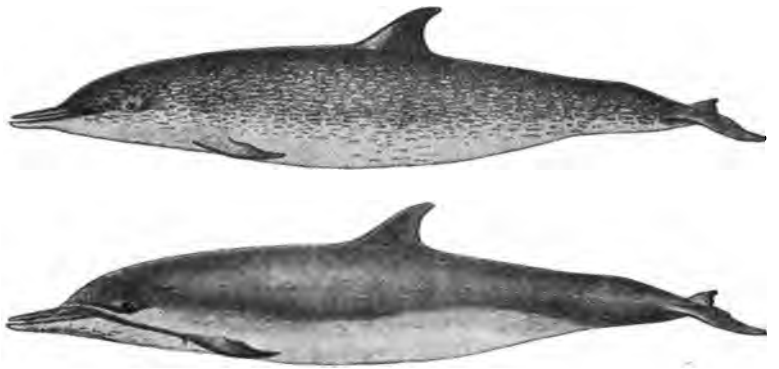

FIG. 1. *Prodelphinus frœnatus* (F. Cuvier).

(From Lütken, K. Danske Videnskabs Selskabs Skrifter, 6te Række, v. 1889. Two varieties. The form of the body is conventional.)

FIG. 2. *Prodelphinus frœnatus* (F. Cuvier).

(From Gray, Synopsis of the Whales and Dolphins, 1868, pl. 25.)

GENUS PRODELPHINUS.

FIG. 1. *Prodelphinus frœnatus* (F. Cuvier). Young.
(From F. Cuvier, Histoire naturelle des Cétacés, 1836, pl. 10, fig. 1.)

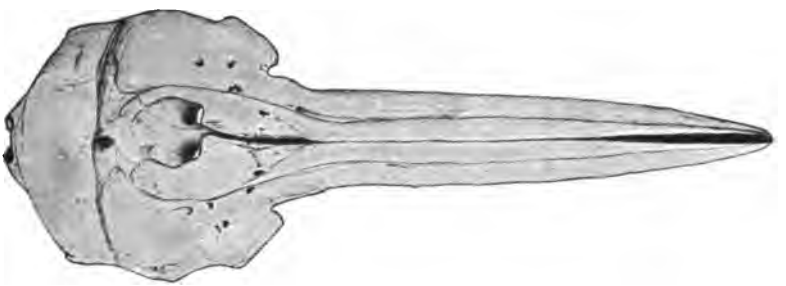

FIG. 2. *Prodelphinus longirostris* (Gray).
(From Gray, Synopsis of the Whales and Dolphins, 1868, pl. 25. *Delphinus microps.*)

GENUS PRODELPHINUS.

FIG. 1. *Tursio peronii* (Lacépède).

(From Gray, Synopsis of the Whales and Dolphins, 1868, pl. 15, fig. 1.)

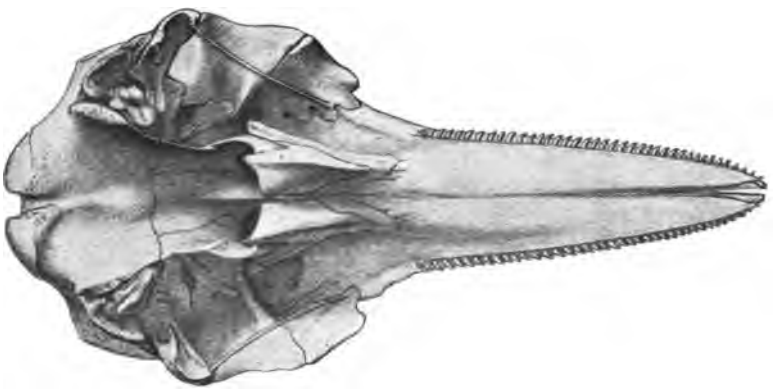

FIG. 2. *Tursio peronii* (Lacépède).

(From Van Beneden and Gervais, Ostéographie, pl. 38, fig. 3.)

GENUS TURSIO.

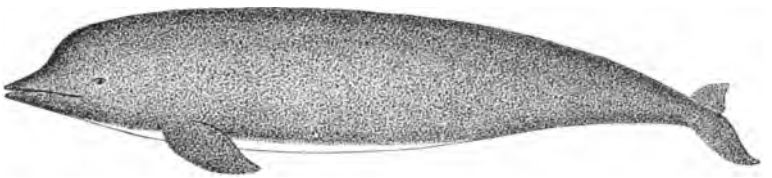

FIG. 1. PACIFIC RIGHT-WHALE PORPOISE.

Tursio borealis (Peale).

(From Scammon, Marine Mammalia, 1874, pl. 19, fig. 4.)

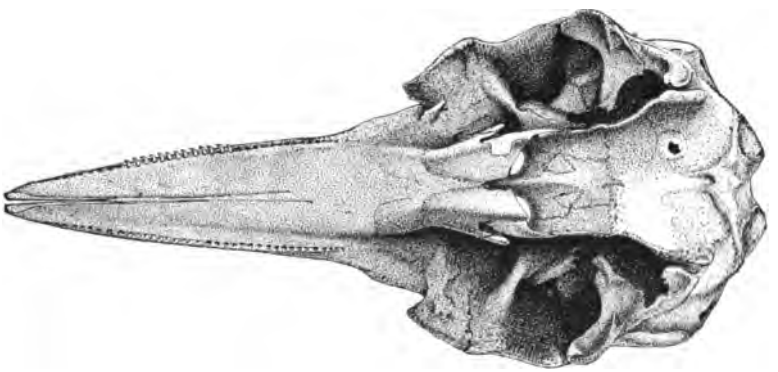

FIG. 2. PACIFIC RIGHT-WHALE PORPOISE.

Tursio borealis (Peale).

(From skull No. 8160, in the U. S. National Museum.)

GENUS TURSIO.

FIG. 1. STRIPED DOLPHIN.

Lagenorhynchus acutus Gray.

(From a photograph in the U. S. National Museum, of an individual captured at Woods Ho!l, Mass.)

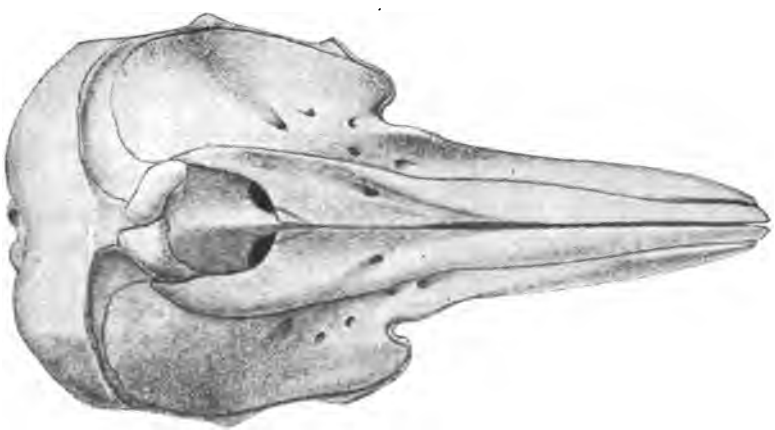

FIG. 2. STRIPED DOLPHIN.

Lagenorhynchus acutus Gray.

(From Van Beneden and Gervais, Ostéographie des Cétacés, 1868–'79, pl. 36, fig. 4.)

GENUS LAGENORHYNCHUS.

FIG. 1. *Lagenorhynchus fitzroyi* (Waterhouse).

(From Waterhouse, Zoology of the Voyage of the Beagle, Mammalia, 1839, pl. 10.)

FIG. 2. *Lagenorhynchus thicolea* Gray.

(From Gray, Synopsis of the Whales and Dolphins, 1868, pl. 36.)

GENUS LAGENORHYNCHUS.

FIG. 1. *Lagenorhynchus cruciger* (d'Orbigny et Gervais).

(From d'Orbigny and Gervais, Voyage dans l'Amérique Méridionale, ix, 1847, pl. 21, fig. 4.)

FIG. 2. *Lagenorhynchus cruciger* (d'Orbigny et Gervais).

(From Van Beneden and Gervais, Ostéographie des Cétacés, 1868–'79, pl. 36, fig. 3.)

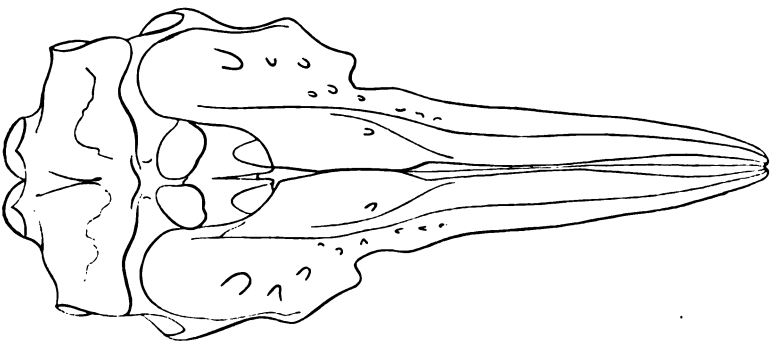

FIG. 3. *Lagenorhynchus superciliosus* (Schlegel).

(From Schlegel, Abhandlungen aus dem Gebiete der Zoologie, 1841, pl. 1, fig. 3.)

GENUS LAGENORHYNCHUS.

FIG. 1. WHITE-BEAKED DOLPHIN.

Lagenorhynchus albirostris Gray.

(From Lütken, Kgl. Danske Videnskabs Selskabs Skrifter, 6te Række, iv, 1887, pl. 2.)

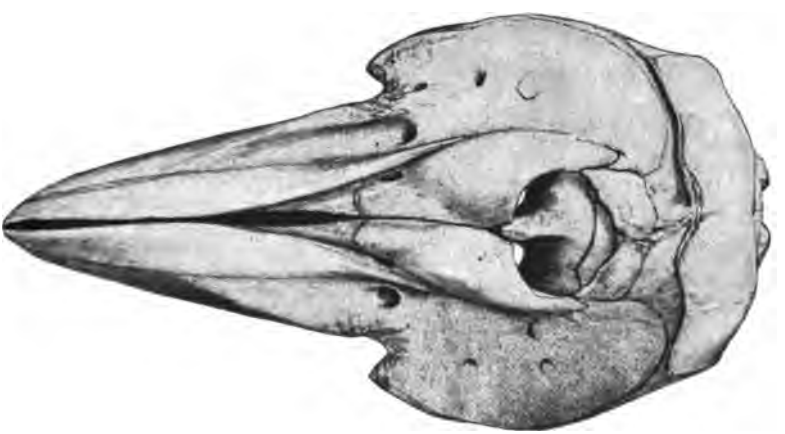

FIG. 2. WHITE-BEAKED DOLPHIN.

Lagenorhynchus albirostris Gray.

(From Gray, Synopsis of the Whales and Dolphins, 1868, pl. 11.)

GENUS LAGENORHYNCHUS.

FIG. 1. *Lagenorhynchus obliquidens* Gill.
(From Scammon, Marine Mammalia, 1874, pl. 19, fig. 2.)

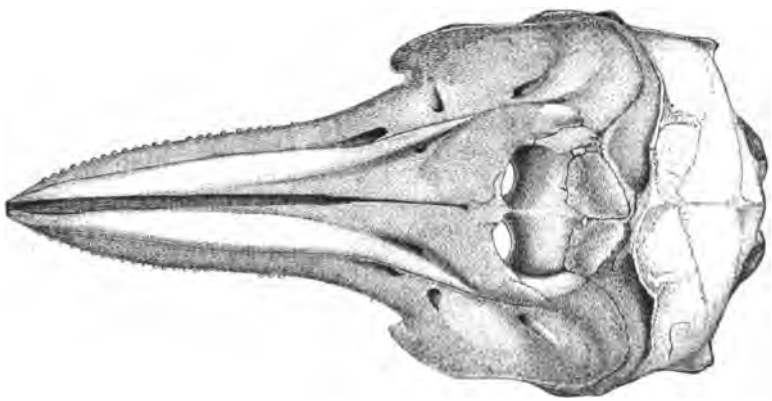

FIG. 2. *Lagenorhynchus obliquidens* Gill.
(From the type-skull, No. 1963, in the U. S. National Museum.)

GENUS LAGENORHYNCHUS.

FIG. 1. *Lagenorhynchus electra* Gray.

(From Peale, U. S. Exploring Expedition, Mammalogy and Ornithology, Atlas, pl. 5, fig. 2.)

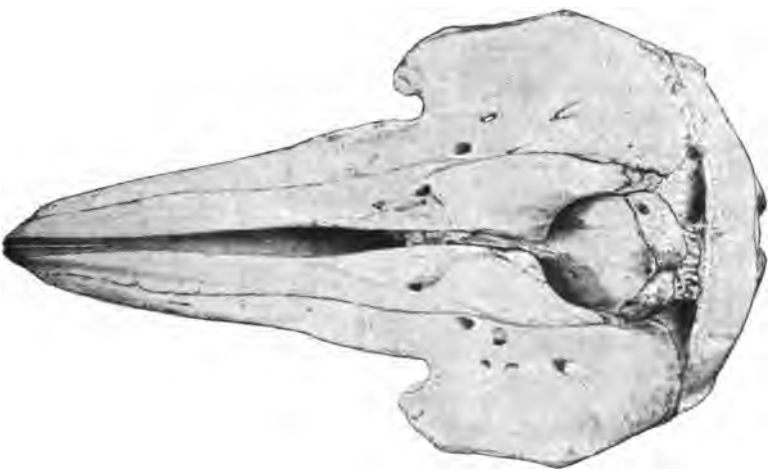

FIG. 2. *Lagenorhynchus electra* Gray.

(From Gray, Synopsis of the Whales and Dolphins, 1868, pl. 14.)

GENUS LAGENORHYNCHUS.

FIG. 1. *Lagenorhynchus obscurus* (Gray).

(From Gray, Spicilegia Zoologica, 1828, pl. 2, fig. 3.)

FIG. 2. *Lagenorhynchus obscurus* (Gray).

(From Gray, Synopsis of the Whales and Dolphins, 1868, pl. 16.)

GENUS LAGENORHYNCHUS.

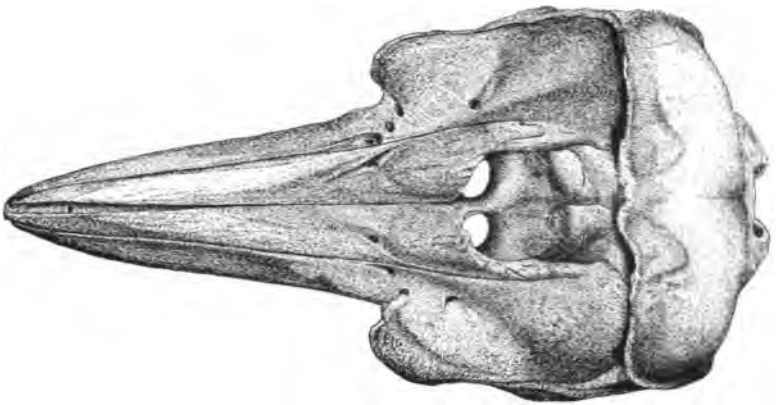

FIG. 1. *Sagmatias amblodon* Cope.
(From the type-skull, No. 3887 in the U. S. National Museum.)

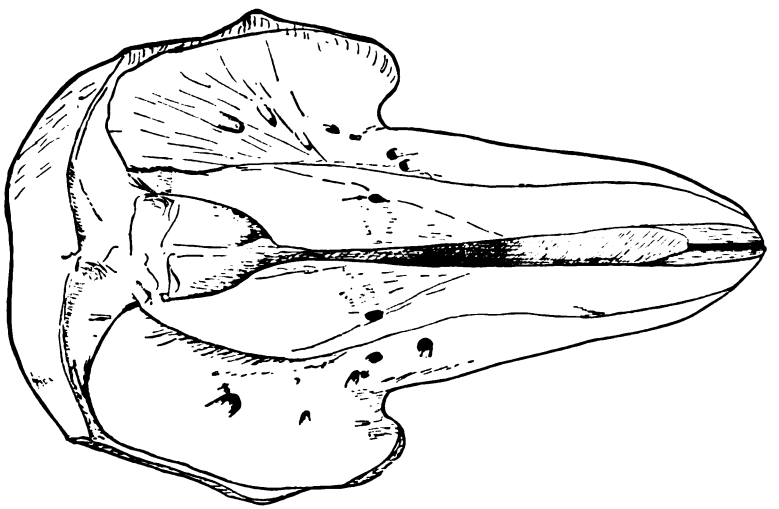

FIG. 2. *Feresa intermedia* Gray.
(From Gray, Synopsis of the Whales and Dolphins, 1868, pl. 8.)

GENERA SAGMATIAS AND FERESA.

FIG. 1. *Cephalorhynchus heavisidei* Gray.

(From P. J. Van Beneden, Bulletin de l'Académie Royale de Belgique, 2d series, xxxvi, 1873, pp. 32-40, 1 pl.)

FIG. 2. *Cephalorhynchus heavisidei* Gray.

(From Van Beneden and Gervais, Ostéographie des Cétacés, 1868-'79, pl. 36, fig. 1.)

GENUS CEPHALORHYNCHUS.

FIG. 1. *Cephalorhynchus albifrons* True.

(From Hector, Transactions of the New Zealand Institute, v, 1873, pl. 3.)

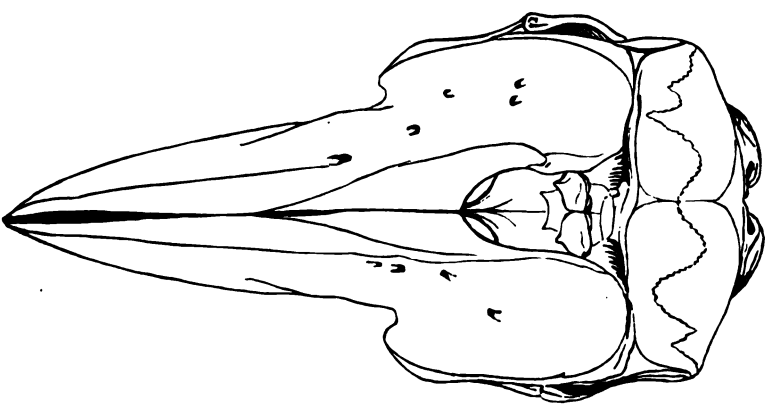

FIG. 2. *Cephalorhynchus albifrons* True.

(From Hector, Transactions of the New Zealand Institute, v, 1873.)

GENUS CEPHALORHYNCHUS.

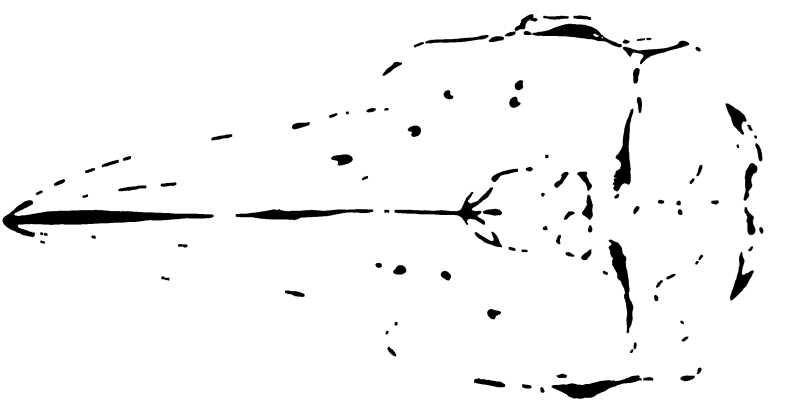

FIG. 1. NAMENO-JUO.

Neomeris phocœnoides (Cuvier).

(From Schlegel, Fauna Japonica, 1850, pl. 25, fig. 1.)

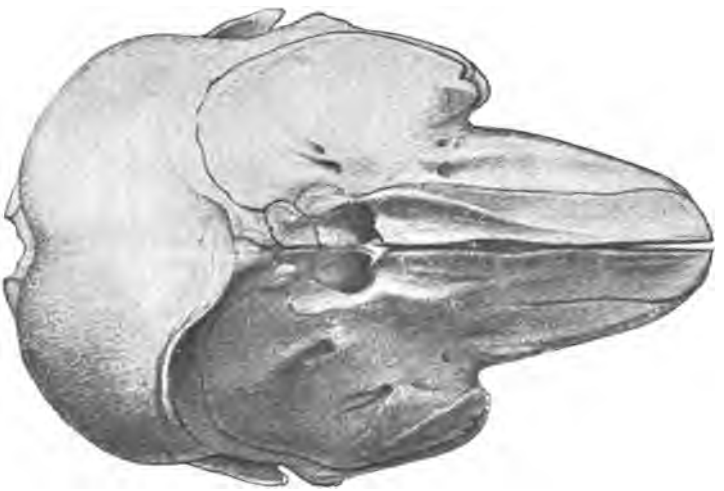

FIG. 2. NAMENO-JUO.

Neomeris phocœnoides (Cuvier).

(From Van Beneden and Gervais, Ostéographie des Cétacés, 1868–'79, pl. 56, fig. 1.)

GENUS NEOMERIS.

FIG. 1. HARBOR PORPOISE; HERRING HOG.

Phocœna communis Lesson.

(From a photograph in the U. S. National Museum.)

FIG. 2. HARBOR PORPOISE; HERRING HOG.

Phocœna communis Lesson.

(From Van Beneden and Gervais, Ostéographie des Cétacés, 1868–'79, pl. 56, fig. 10.)

GENUS PHOCÆNA.

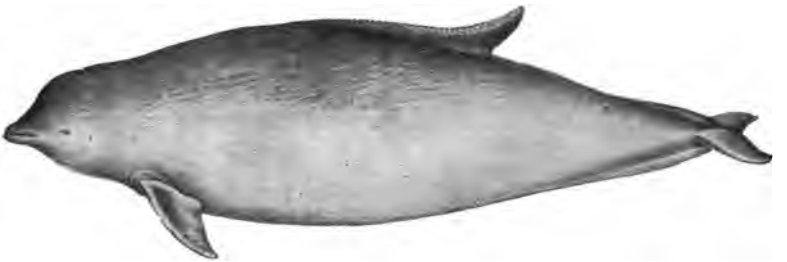

FIG. 1. *Phocœna spinipinnis* Burmeister.

(From Burmeister, Anales del Museo Público de Buenos Aires, i, 1864–'69, pl. 23, fig. 2.)

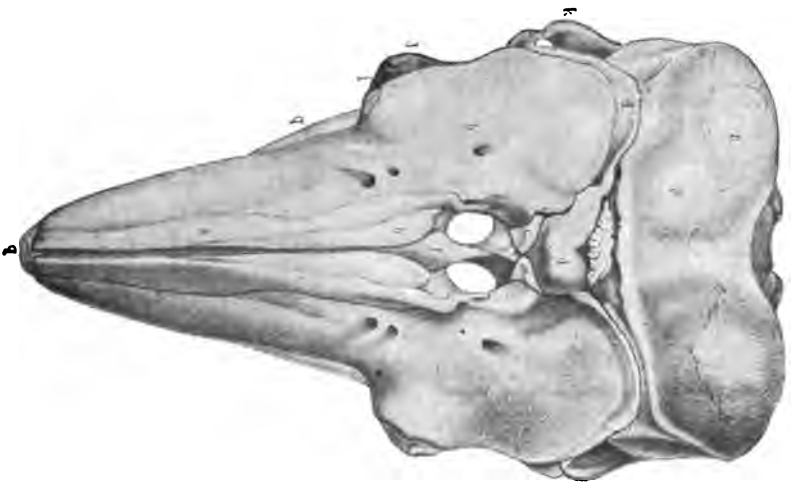

FIG. 2. *Phocœna spinipinnis* Burmeister.

(From Burmeister, Anales del Museo Público de Buenos Aires, i, 1864–'69, pl. 24, fig. 1.)

GENUS PHOCÆNA.

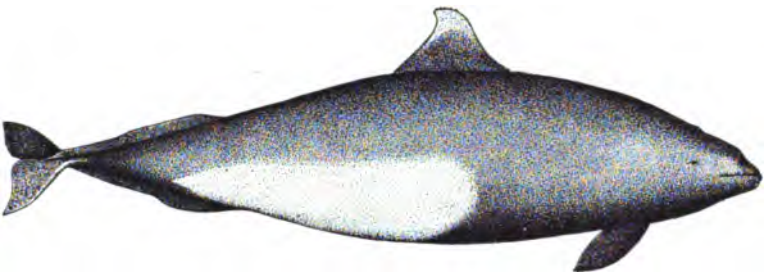

FIG. 1. DALL'S HARBOR PORPOISE.

Phocœna dallii True.

(From a drawing by William H. Dall.)

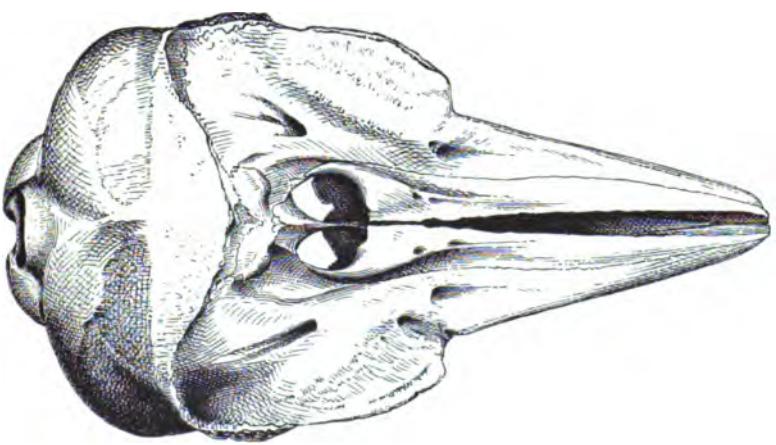

FIG. 2. DALL'S HARBOR PORPOISE.

Phocœna dallii True.

(From a drawing by William H. Dall of the type-skull, No 21762, in the U. S. National Museum.)

GENUS PHOCÆNA.

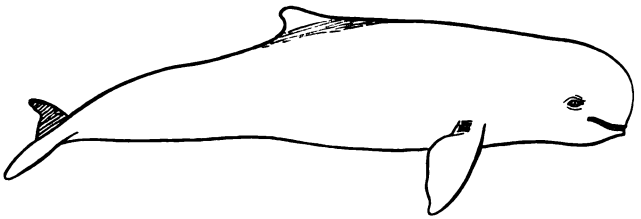

FIG. 1. *Orcella brevirostris* (Owen).

(From Van Beneden and Gervais, Ostéographie des Cétacés, 1868–'79, p. 552.)

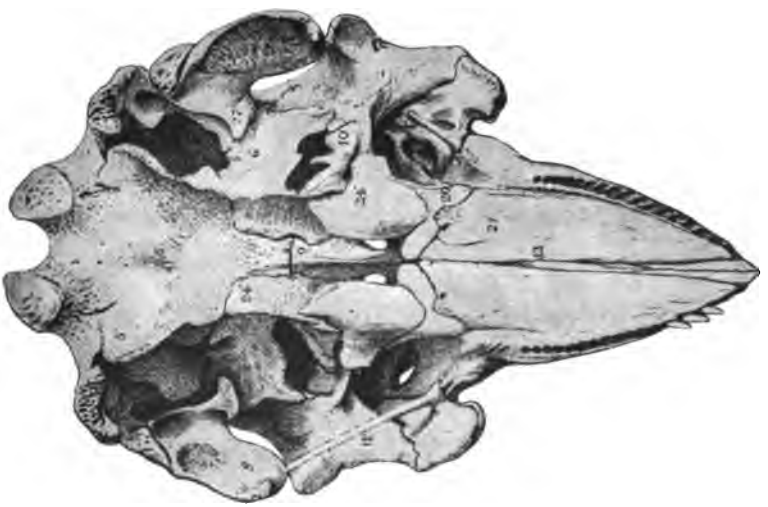

FIG. 2. *Orcella brevirostris* (Owen).

(From Owen, Transactions of the Zoological Society of London, vi, 1869, pl. 9, fig. 3.)

GENUS ORCELLA.

FIG. 1. GRAMPUS

Grampus griseus (Cuvier)

(From Flower, Transactions of the Zoological Society of London, viii, 1872, pl. 1, fig. 1.)

FIG. 2. GRAMPUS.

Grampus griseus (Cuvier).

(From Van Beneden and Gervais, Ostéographie des Cétacés, 1868–'79, pl. 54, fig. 7.)

GENUS GRAMPUS.

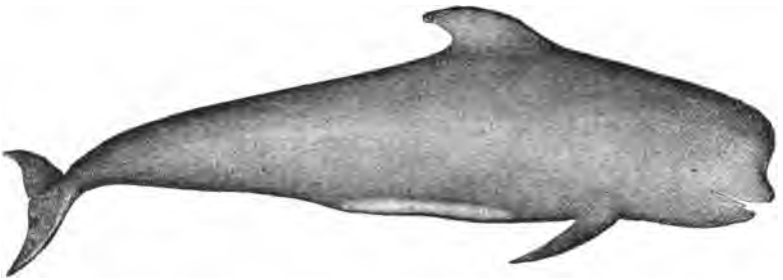

FIG. 1. COMMON BLACKFISH.

Globicephalus melas (Traill).

(From Murie, Transactions of the Zoological Society of London, viii, 1873, pl. 30, fig. 1.)

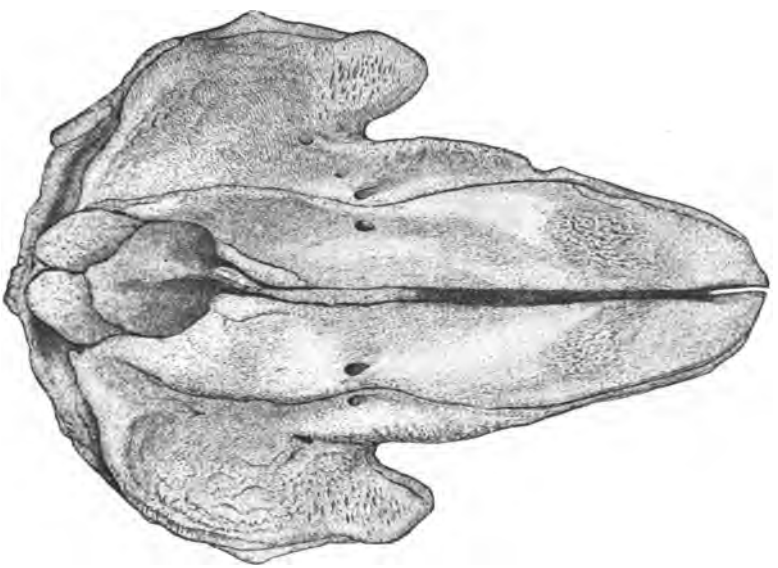

FIG. 2. COMMON BLACKFISH.

Globicephalus melas (Traill).

(From Gray, Catalogue of the Whales and Dolphins, 1866, p. 316, fig. 62.)

GENUS GLOBICEPHALUS.

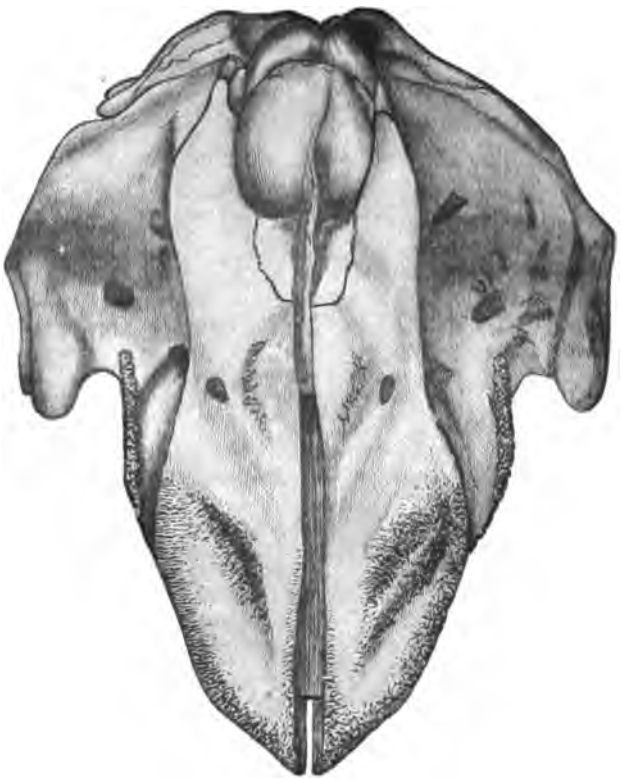

FIG. 1. *Globicephalus brachypterus* Cope.

(From Cope, Proceedings of the Academy of Natural Sciences, Philadelphia, 1876, p. 131.)

GENUS GLOBICEPHALUS.

FIG. 1. NORTH PACIFIC BLACKFISH.

Globicephalus scammoni Cope.

(From Scammon, Marine Mammalia, 1874, pl. 16, fig. 1.)

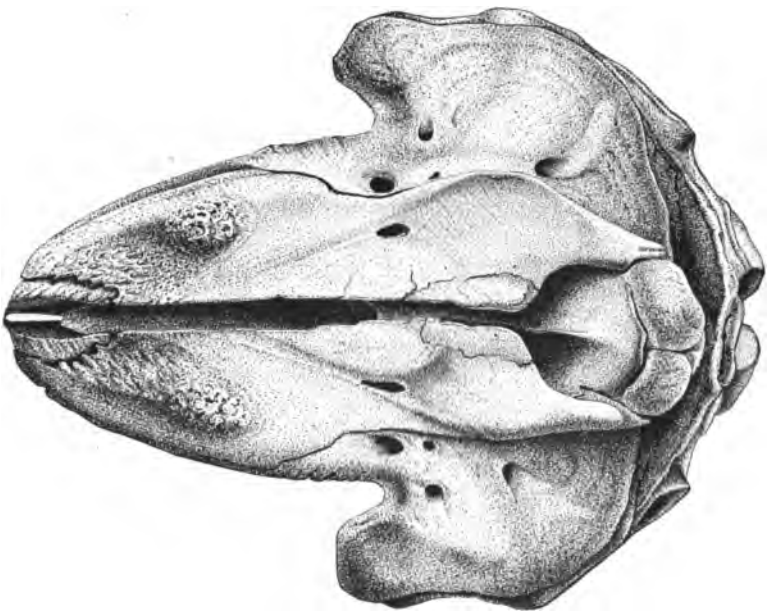

FIG. 2. NORTH PACIFIC BLACKFISH.

Globicephalus scammoni Cope.

(From skull No. 9074, in the U. S. National Museum.)

GENUS GLOBICEPHALUS.

FIG. 1. *Globicephalus sieboldii* Gray.
(From Schlegel, Fauna Japonica, Mammalia, 1850, pl. 27, fig. 1.)

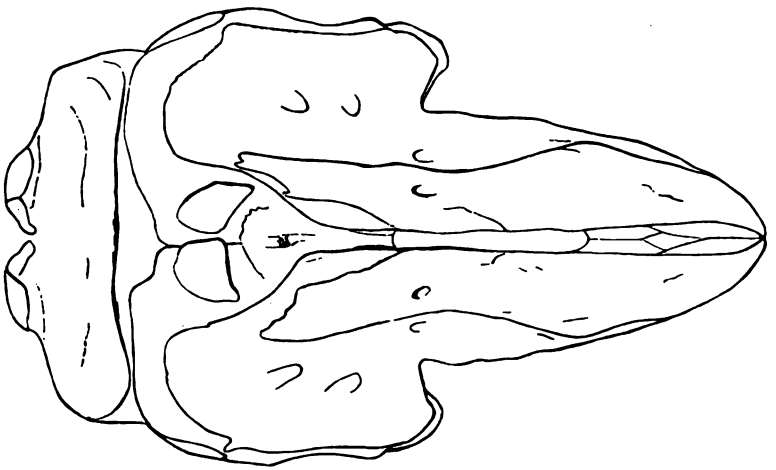

FIG. 2. *Globicephalus sieboldii* Gray.
(From Schlegel, Fauna Japonica, Mammalia, 1850, pl. 27, fig. 1.)

GENUS GLOBICEPHALUS.

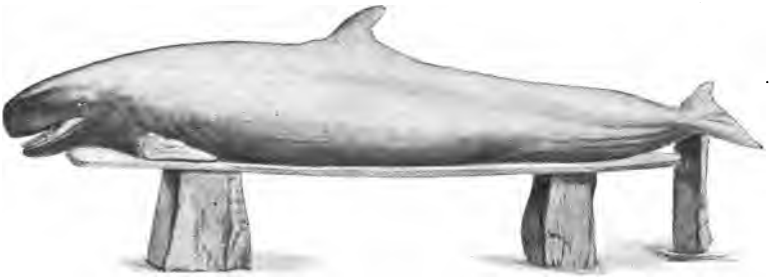

FIG. 1. *Pseudorca crassidens* (Owen).

(From Reinhardt, Pseudorca crassidens, Ray Society, 1866, p. 191.)

FIG. 2. *Pseudorca crassidens* (Owen).

(From Van Beneden and Gervais, Ostéographie des Cétacés, 1868–'79, pl. 50, fig. 7.)

GENUS PSEUDORCA.

FIG. 1. KILLER WHALE.

Orca gladiator (Lacépède).

(From Lütken, Kgl. Danske Videnskabs Selskabs Skrifter, 6te Række. iv, 1887, pl. 1.)

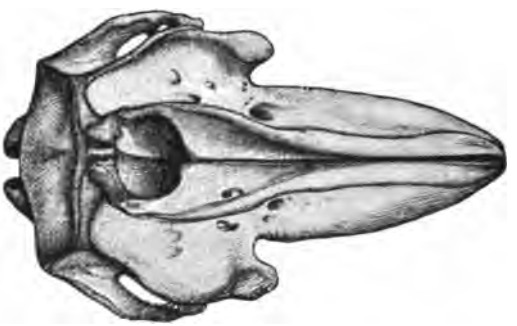

FIG. 2. *Orca gladiator* (Lacépède).

(From Lütken, Kgl. Danske Videnskabs Selskabs Skrifter, 6te Række, iv, 1887, p. 372, fig. 9.)

GENUS ORCA.

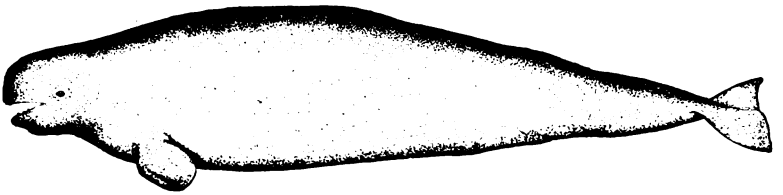

FIG. 1. WHITE WHALE.

Delphinapterus leucas (Pallas).

(From a photograph of a specimen received by the Smithsonian Institution.)

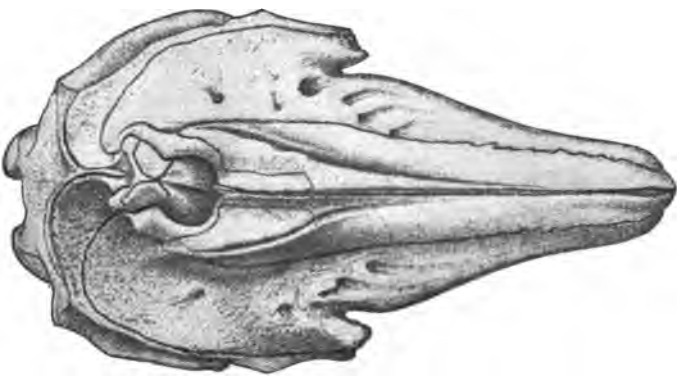

FIG. 2. WHITE WHALE.

Delphinapterus leucas (Pallas).

(From Van Beneden and Gervais, Ostéographie des Cétacés, 1868–'79, pl. 44, fig. 2.)

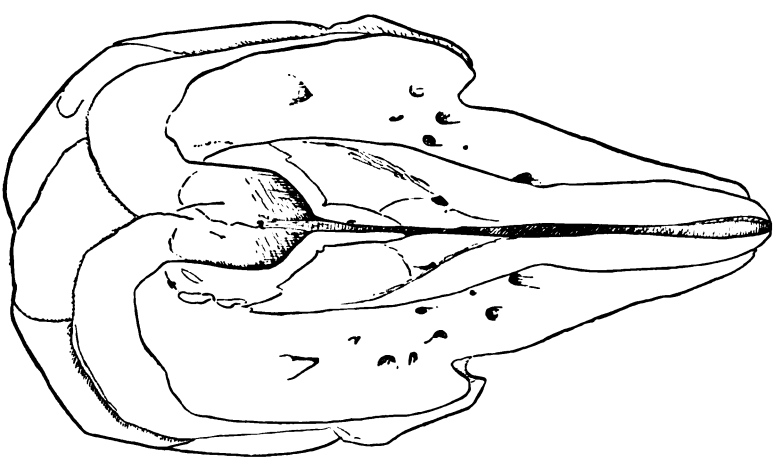

FIG. 3. *Delphinapterus kingii* (Gray).

(From Gray, Synopsis of the Whales and Dolphins, 1868, pl. 7.)

GENUS DELPHINAPTERUS.

FIG. 1. NARWHAL. Male.

Monodon monoceros Linné.

(From Bell's British Quadrupeds, 2d edition, 1874, p. 435.)

FIG. 2. NARWHAL. Male.

Monodon monoceros Linné.

(From Bell's British Quadrupeds, 2d edition, 1874, p. 439.)

GENUS MONODON.

SMITHSONIAN INSTITUTION:
UNITED STATES NATIONAL MUSEUM.

BULLETIN

OF THE

UNITED STATES NATIONAL MUSEUM.

No. 37.

A PRELIMINARY CATALOGUE OF THE SHELL-BEARING MARINE MOLLUSKS AND BRACHIOPODS OF THE SOUTHEASTERN COAST OF THE UNITED STATES, WITH ILLUSTRATIONS OF MANY OF THE SPECIES.

BY

WILLIAM HEALEY DALL, A. M.,
Honorary Curator Department of Mollusks, U. S. National Museum.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1889.

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INTRODUCTION.

This work is intended to assist students of the Mollusca in the United States, by bringing together for their use a large number of excellent figures of species belonging to or illustrating the fauna of the southern and southeastern coasts of the United States, from Cape Hatteras south to the Straits of Florida and west to Mexico, with the adjacent waters.

These figures are explained and connected by a catalogue of the mollusks known to inhabit that region, either from the presence of authenticated specimens in the National Museum or on the authority of reputable naturalists who have collected in the region and whose specimens have been seen or reliably identified.

This catalogue, arranged for convenience in tabular form, includes not only the species which are illustrated on the plates but all other species common to the region, as far as known.

Hitherto there has been no catalogue which covered just this ground. There are several catalogues of marine species of particular West Indian islands. There are several lists of Floridian shells, the fullest and best being that just completed in the Proceedings of the Davenport Academy of Sciences by Mr. Charles T. Simpson. These all refer, however, to a much more restricted field than the present list, and the nomenclature in some cases is more or less inaccurate, as of course must be the case with all lists, each of which, in spite of its inevitable imperfections, should show some advance over its predecessors. This is all that the writer would claim for the present catalogue, which, owing to peculiar circumstances, has been rather hurriedly decided upon and rapidly prepared.

In order that the number of columns in the table should be compressed within the space of two opposite pages and yet admit of the use of brevier type, it has been necessary to limit the number of stations in the geographical series so that each column should represent a stretch of coast and seaward from it the archibenthal area or continental slope beyond the fifty-fathom line to the oceanic floor. Then various puzzling questions arose in attempting to decide which column should be used in certain cases; as, for instance, in specimens dredged in the path of the Gulf Stream between Cuba and the Florida Keys. They might with equal propriety be assigned to the "Florida Keys" or to the "West Indies" column, or to both. In all cases the facts have been

closely adhered to, as in leaving blank the "Georgia" column when specimens had been collected only in South Carolina and East Florida, with no data for the intermediate stretch of coast. This will show the real gaps in our knowledge of the distribution, and it is to be hoped will stimulate local students to fill them up.

The extreme northern and extreme southern range are generally given. When a species has been obtained off shore, and at one locality only, the extreme is usually noted in one column only, with a leaning toward the northern column when the species is supposed to be a southern form and to the southern column when it is thought to extend from the colder area. These assignments must often be conjectural, but when clearly understood they should not be in any way misleading.

There are many unidentified species from this region in the National collection, a large proportion of which may prove to be new. In such cases the insertion of their distribution, as far as known, may lead to fuller investigation by collectors, though no specific name can be applied to them in the catalogue.

When a species whose name appears in one of the cited publications is not found in this catalogue, or is not cited from the locality to which the published authority refers it, the reader may infer that either the prior identification is here regarded as inaccurate, or, more generally, that the prior name is not entitled to be used.

In many cases the full explanation for such changes will be found in the Report on the Blake Mollusca, but in the present catalogue it has been quite impracticable, as well as undesirable, to attempt any synonymy.

The writer has attempted to steer a middle course between overdivision of large natural groups and the conservatism which confounds unlike things together. It is not to be expected that his decisions will be universally acceptable or satisfactory, since there are "many men, many minds" in biology as well as worldly affairs.

In practice, to be a good systematic malacologist requires much study and a wide knowledge of the literature. It is no longer possible in systematic conchology for a student to acquire facility without a good library and long practice. One may be a good naturalist and do valuable work for science, however, without being a systematist, and the field of work is so vast that the earnest worker may keep himself employed in almost any district south of Sandy Hook. The writer has found a reasonable amount of subdivision of the familiar genera of use in clear thinking and in endeavoring to formulate accurately the facts of nature. Subgenera and sections have therefore been introduced into the catalogue, to be used or discarded as the reader may prefer.

Some groups have been pretty thoroughly investigated and the subdivisions may be named with confidence, and have therefore been inserted. In other cases a thorough revision is yet to be made and the subdivisions can not be named with confidence, and, therefore, are to a

great extent omitted. This list approximately represents our present knowledge, both in its acquirements and its defects, and is intended as a help toward something better and not in any sense as a finality in nomenclature or distribution.

We may now proceed to an explanation of the form and scope of the Tables.

Taking the columns serially, the first carries a serial number useful for check-list and exchange purposes. Then follows the name and authority. Then comes a column referring to the number of the plate or plates, and another for the numbers of the figures. As the figures on most of the plates are drawn to very different scales, a column is inserted, giving the maximum length, axial in Gastropods, antero-posterior in Pelecypods, of the specimen in millimeters. One millimeter is practically one twenty-fifth, or four one-hundredths, of an inch, so that for those unaccustomed to the metric system there is little difficulty in reducing the millimeters to fractions of an inch.

When no dimension is given in the column it will be understood that the figure, if any, is of the size of nature; or that its magnification or diminution is stated on the plate itself, or represented there by a line or other conventional sign.

The next column states the range in depth as far as known of each species in the form of a fraction, the least depth forming the numerator and the greatest observed depth the denominator. Where a zero occurs it indicates that the species is found at low-water mark. The maximum and minimum are selected from the whole range, domestic or exotic, recorded for the species in question. When no depth is stated it will be understood that the species is supposed to inhabit the shallow water near shore or between tides.

This is succeeded by a column in which the extreme northern limit, locality, or region of the species referred to is recorded. When this relates to a locality within our special region there will seem sometimes to be a discrepancy; as, for instance, when a species appears as present in the "Hatteras" column, while in the "northern extreme" column Charleston, S. C., will be found. But, as will be immediately shown, Hatteras in the heading of the column does not mean a locality but a district, extending from Savannah, Georgia, to Cape Hatteras, North Carolina, so that the discrepancy is only apparent. In the off-shore dredgings it has been practicable sometimes to give only the latitude, or a general term such as "Arctic seas," to indicate the northernmost distribution of a species, since there has been no adjacent landmark to cite for northern limit. When a species has its northern limit on the rich archibenthal grounds off Block Island and the Vineyard, or Nantucket, I have indicated this by "Rhode Island" in the column, since this sufficiently guides foreign students who might be puzzled by the other names so much less apt to be found on small-scale maps of our eastern coast. The data for such species will be found chiefly in the

papers on material gathered by the U. S. Fish Commission, contributed by Prof. A. E. Verrill to the Transactions of the Connecticut Academy of Sciences, to the American Journal of Science, and to the Reports of the U. S. Fish Commissioner for 1871–'72 and 1883.

Then follow ten columns, each representing a district, as follows:

1. *New Jersey* (N. J.). This includes the coast and adjoining archibenthal area from the entrance of Chesapeake Bay to Sandy Hook at the south point of entrance to New York Bay and Harbor.
2. *Virginia* (Va.). This includes the coast, etc., from Cape Hatteras, North Carolina, to the mouth of Chesapeake Bay.
3. *Hatteras* (Hat.). This district extends from the mouth of the Savannah River, Georgia, to Cape Hatteras, North Carolina, with the adjacent archibenthal area.
4. *Georgia* (Ga.). At Cape Canaveral, Florida, the path of the Gulf Stream seems to diverge more from the main coast than previously. It seems that a good many southern species do not reach farther north on the shores than Cape Canaveral. Therefore this district from Cape Canaveral to the Savannah River has been separated from the one that I have called East Florida.
5. *East Florida* (East Fla.). This includes the region between Biscayne Bay and Cape Canaveral.
6. *Florida Keys* (Fla. Keys). This region, very intimately connected, faunally, with the northern shores of Cuba opposite, and with the Bahamas, includes the region south of Biscayne Bay on the east, and south of the southern entrance to Charlotte Harbor on the west side of the Peninsula, to and including the Keys and Tortugas reefs and islands.
7. *West Florida* (West Fla.). This includes the region north of the south entrance to Charlotte Harbor and westward to the Mississippi delta along the shore and the archibenthal area of the Gulf of Mexico westward from the peninsula to west longitude 90°, and southward to the trough between Cuba and Florida.
8. *Texas* (Tex.). In this district I include the shores of the United States from the Mississippi delta to the Rio Grande and the archibenthal area southward from it in the Gulf of Mexico to Yucatan.
9. *West Indies* (West Ind.). In this district, for want of space on the page, I have been obliged to include all of the Antilles, the Bahamas, and the shores and islands of the Caribbean Sea. The particular southern extension of a species not known to extend throughout this area will be indicated by the entry in the "southern limit" column. No species not figured on the plates, or common to the coast of the United States, is admitted in the catalogue, so that the West Indian or Antillean fauna properly so-called is almost wholly excluded from this enumeration. Some few species, which are strictly Antillean, as far as known, are included because it was necessary to refer to their figures on the plates, but the distribution as recorded in the table will enable any one desiring to discuss the purely North American species to identify and exclude these extra-limital forms without difficulty. To make the distinction more apparent their names appear in italics in the catalogue.
10. *Bermuda*. The island of Bermuda and its associated reefs is intimately allied by its mollusk fauna to the region of the Florida Keys and Northern Antilles. A column has therefore been provided for it.

A few species common to our southern coast are also found without essential modification still living on the west coast of Central America,

Mexico, or California. These forms are very interesting, as most of the species originally common to both have developed special modifications since the separation of the two oceans, so as to be entitled to separate specific names.

A column (West. Am.) is devoted to recording those found on both sides of the continent yet which still remain essentially unchanged, and another (Eur.) to those whose range extends to European shores.

Another column is devoted to the southern extreme limit (as far as known) of the species enumerated in the catalogue, corresponding on the south to the column for northern limit on the north. Many Antillean species extend on the Brazilian coast far south of Cape San Roque, but our records for this region are very imperfect, and many of the items in this column are due to the data obtained by the U. S. Fish Commission steamer *Albatross* on her voyage from the Chesapeake Bay around to California via the Straits of Magellan only a year ago.

A column records the oldest known appearance of a species in geological time. This column is very imperfect and inadequate to express the real state of the case, since many of our recent species have been described from our southern tertiaries under other names, and the duplication thus occasioned, except in a comparatively small number of species, still remains to be worked out. It was thought well, however, to make a beginning in the matter in this instance.

This completes our description of the table, which will enable any one to use the latter intelligently and without misconception.

In making entries in the columns showing distribution an asterisk shows that the species is known from that region from the shores, either picked up on the beach or found living between high water and fifty fathoms, or that the depth it inhabits is not known but is supposed to be small. In cases where the species is recorded from the archibenthal area only, say 50 to 800 fathoms, its presence is indicated by a dagger point in the column. When both an asterisk and a dagger point are found in a single column the species is supposed to occur, or is recorded as obtained, both in shallow and in deep water, within the limits of that region or district. Many southern species, found in the cool water of the deeps in the south, approach the surface in the cooler surface waters of their northern range. *Vice versa*, we find northern littoral species seeking the deeps as they approach the limits of their southern range. A glance at the columns frequently will illustrate these facts.

The data from which the tables which form the bulk of this publication have been compiled are chiefly comprised in the collections of the U. S. National Museum, the Museum of Comparative Zoology in Cambridge, Mass., and the publications of the writer on these collections. The works in which detailed information has been chiefly sought are specified on another page, but the most important for this purpose has been the Report on the Blake Brachiopoda, Pelecypoda,

Gastropoda, and Scaphopoda, published in two parts by the Museum of Comparative Zoology, under the direction of Prof. Alexander Agassiz. The generosity of Professor Agassiz in permitting the use of plates prepared for that report was decisive in insuring the preparation of this list. Other plates are made up of figures which have appeared in the annual reports of the U. S. Commissioner of Fish and Fisheries; in the Proceedings of the National Museum; the edition of Gould's Invertebrata of Massachusetts, edited by Mr. W. G. Binney; Professor Verrill's and Miss Bush's papers in the Transactions of the Connecticut Academy of Sciences; and the publications of the British Museum. For the use of these cuts we are indebted chiefly to the Smithsonian Institution and the U. S. Commissioner of Fisheries, Col. Marshall Macdonald.

In including or omitting groups of mollusks in this catalogue the compiler has necessarily been guided by convenience rather than systematic completeness. Some groups, such as the Nudibranchiata, are so imperfectly known from the region south of New England that it becomes imperative that they should be entirely omitted. An attempt to include them would certainly have been more likely to retard than to advance the progress of science. For the same reason partly, and partly because it is impracticable to reproduce the figures, the entire group of Cephalopoda, except the Argonaut and Spirula, has been left out. Those who desire to study these difficult animals are referred to Professor Verrill's excellent reports upon the subject in the Bulletin of the Museum of Comparative Zoology and the Transactions of the Connecticut Academy of Sciences. The two exceptions are included merely because of one we have an excellent figure, and the shell of the other is frequently obtained by collectors on our southern shores.

Among those animals which frequent the sea-shore and are often found in as well as near the water, though really air-breathers, the *Auriculidæ*, *Siphonariidæ*, and *Gadiniidæ* can almost be regarded as marine. Having good figures of some of them and desiring to err, if at all, on the side of convenience to the amateur collector or beginner in conchology, they have been included in our list. For the same reason *Neritina*, *Cyrena*, etc., have been inserted even when not strictly salt-water species.

The Pteropods, of the sea off our coasts, are rarely found by collectors, and the nomenclature is not in a satisfactory state. Still it was thought best to include a list of the species taken, with some additions,
[illegible]y from Professor Verrill's papers, though completeness or entire
[illegible]cy is not claimed for it. The Heteropods, except *Atlanta Cari-*
and *Oxygyrus*, are not included.

[illegible]ill be seen from these explanations that the present catalogue is
[illegible]king list for the benefit of collectors and students, rather than a
[illegible]tific treatise or thoroughly revised enumeration of the mollusk
[illegible]a. Indeed it is in its quality of a stepping-stone to the latter that

such value as it may possess inheres. Experience has shown that check-lists, however imperfect in themselves, are extremely useful in stimulating faunal research, and it is in the hope that this result will be secured that the compiler finds his chief return for the labor and time expended upon a confessedly imperfect production.

Having been for some time engaged in a revision of the general system for the classification of Pelecypods, which will shortly appear in print, the revised classification has been used in the List of Pelecypoda, Table II, as far as it is applicable thereto.

The writer is under particular obligations to Prof. Alexander Agassiz, as already stated, and also to Professor Verrill and Miss Bush for the use of drawings and for an unpublished list of shallow-water mollusks obtained near Cape Hatteras, which has added to our list several species and confirmed several others about which I had felt some doubt. The different sources of the figures will be found acknowledged under the "Explanation of the Plates" in each case.

In conclusion, the writer expresses his obligation to the gentlemen whose writings have been laid under contribution; to all who have facilitated his endeavors to form a representative collection of this mollusk fauna, for the use of students in the National collection; and to Dr. R. E. C. Stearns, of the U. S. Geological Survey, for invaluable personal assistance. The compiler solicits correspondence from all interested, toward the improvement of this catalogue and especially series of the local shells from any point on the coast which may shed light on the geographical distribution of the species. Such correspondence or material may be addressed to the Curator of the Department of Mollusks at the U. S. National Museum, Washington, D. C., or in care of the Smithsonian Institution.

WASHINGTON, *May* 15, 1889.

LIST OF WORKS REFERRED TO FOR THE GEOLOGICAL OR GEOGRAPHICAL DISTRIBUTION OF SPECIES CITED IN THIS CATALOGUE, OR CONTAINING ENUMERATIONS OF LOCAL FAUNÆ INCLUDED IN THE GENERAL REGION TO WHICH THIS CATALOGUE RELATES.

Adams (Charles Baker). Specierum novarum conchyliorum in Jamaica repertorum synopsis.

In Boston Society of Natural History; Proceedings. Boston, the society, 1845. Vol. II, pp. 1–17, Jan., 1845. 8°.

——— Contributions to conchology. New York, H. Baillière, Oct. 1849–Nov. 1852.

Vol. I, iv, 258 pp. 8°. This was published in short, carefully dated parts, the dates of which it seems unnecessary to cite.

——— Monograph of Vitrinella, a new genus of new species of Turbinidæ. Amhert, Mass., the author, Feb., 1850.

10 pp. 8°.

American Journal of Conchology, edited by George W. Tryon, jr. Philadelphia, G. W. Tryon, jr. 1865–1866.

2 vols. 8°. Also:

——— The same. Philadelphia, Conchological Section of the Academy of Natural Sciences, 1867–1872.

5 vols. 8°.

Arango y Molina (Rafael). Contribucion á la fauna malacológica Cubana. Habana, G. Montiel y Comp., 1878.

Pp. 280, 35. 8°. This work was first printed in the Anales de la Real Academia de Ciencias Médicas, Físicas y Naturales de la Habana, beginning in March, 1878; to signature 3, May 15, 1878; to signature 12, January 15, 1879; to signature 14, February 15, 1879; to signature 15, April 15, 1879; to signature 17, June 15, 1879; and the remainder July 15, 1880, with a separately paged index.

Beau (Commandant). Catalogue de coquilles recueillies à la Guadeloupe et ses dépendances. Par M. Beau, chef de bataillon d'infanterie de la marine. Précédé d'une introduction par M. P[aul] Fischer. Paris, Paul Dupont, 1858.

Pp. 27. 8°. Ext. de la Revue Coloniale. 8°. Paris, Paul Dupont, Déc. 1857. Title on cover.

Binney (William G.). Bibliography of North American conchology previous to the year 1860. Washington, the Smithsonian Institution, 1863–1864.

2 v. Vol. I, viii, 650 pp.; vol. II, iv, 298 pp. 8°. This is Smithsonian Miscellaneous Collections No. 174. From the titles contained in it a large number of references might have been cited, where but a few species are mentioned in a given publication, but the numerous papers of this sort are not separated here, as they would have tended to unduly swell the limits of this bibliography without any corresponding gain. (See also Gould, A. A.)

Boston Journal of Natural History, containing papers and communications read to the Boston Society of Natural History, 1834[–]1863, published by their direction. Boston [various publishers], for the society, 1834–1863.

7 vols. 8°.

Bush (Katherine J.). Additions to the shallow-water mollusca of Cape Hatteras, N. C., dredged by the U. S. Fish Commission steamer *Albatross* in 1883 and 1884.

In Transactions Connecticut Academy of Sciences, New Haven, Conn., vol. VI, pp. 453–480, pl. xlv. June, 1885.

——— List of deep-water Mollusca dredged by the U. S. Fish Commission steamer *Fish Hawk* in 1880, 1881, and 1882, with their range in depth.

In Annual Report U. S. Commissioner of Fisheries for 1883. Washington, Government Printing Office, 1885. 8°. Pp. 701–727.

Calkins (William W.). Marine shells of Florida.

Ext. Davenport Academy of Natural Sciences; Proceedings. Davenport, Iowa, the society, 1878. Vol. II, pp. 232–252, pl. viii. 8°. Extract, with bastard title repeated on cover; pagination of original preserved. Slips with addenda were issued by the author on several occasions. This catalogue is partly a compilation. The new or specially interesting species are quoted by Dall (Hemphill's Shells, *q. v.*).

Conchologist's Exchange (The). Edited by William D. Averell. Philadelphia, the editor, 1886-1888.

Vol. I, No. 1, was printed on a postal-card, July, 1886. Nos. 2 to 12, and vol. II, Nos. 1 to 8, were issued in small quarto, the printed form 4½ by 6 inches, in two columns. The last number was dated "March and April, 1888," and appeared about April 30. This publication then suspended and was succeeded by the "NAUTILUS" (*q. v.*) in May, 1889.

Conrad (Timothy Abbott). Fossil shells of the Tertiary formations of North America. Illustrated by figures drawn on stone from nature. Vol. 1. Philadelphia, 1832. 8°. Plates.

[First edition.] Part I, pp. 1–20, pl. 1–6, Oct. 1, 1832.

Part II, pp. 21–28, pl. 7–14, Dec., 1832. A note by the author on the fourth page of the cover.

Part III, pp. 29–38, Aug., 1833. There is a note on the cover about the plates, but none were issued with this part.

Part IV, pp. 39–46, Oct., 1833. On the fourth page of cover there is a note dated November 1, 1833.

[Second edition.] Pp. 29–56, pl. 15–18; a colored map of Alabama, title-page, March 1, 1835. This was issued with Parts I and II of the first edition.

——— Fossils of the Tertiary formations of the United States. Illustrated by figures drawn from nature. Philadelphia, J. Dobson, 108 Chestnut street. E. G. Dorsey, printer, 1838. 8°. Plates.

Part I. Introduction, pp. v-xvi; text, pp. 1–32; pl. 1–17. Jan., 1838. The fourth page of cover has descriptions of four species upon it.

Part II, pp. 33–56, pl. 18–29, May 7, 1840. Three pages of the cover have descriptions of species printed upon them, including the four descriptions from the cover of Part I.

Part III, pp. 57–89, pl. 30–49, Jan., 1845. Nothing but the title printed on cover.

Conrad (Timothy Abbott)—Continued.

This work is often quoted as "Conrad's Fossils of the Medial Tertiary." The dates are determined by manuscript notes of the author, for details in regard to which I am indebted to a note in the American Naturalist for July, 1888, by Dr. Otto Meyer.

——— Descriptions of new species of fossil and recent shells and corals.

In Academy of Natural Sciences of Philadelphia; Proceedings, vol. III, pp. 23–27, pl. 1–2, Feb., 1846.

——— Descriptions of two new genera and new species of recent shells, etc.

In Academy of Natural Sciences of Philadelphia; Proceedings, vol. IV, p. 121, Dec., 1848.

——— Synopsis of the genus Cassidula Humphrey and of a proposed new genus, Athleta.

In Academy of Natural Sciences of Philadelphia; Proceedings, vol. VI, pp. 448–449, Dec., 1853.

——— Notes on shells, with descriptions of three recent and one fossil species.

In Academy of Natural Sciences of Philadelphia; Proceedings, vol. VII, pp. 31–23, March, 1854.

——— Description of a new genus of the family Dreissenidæ.

In Academy of Natural Sciences of Philadelphia; Proceedings, new series, 1857, p. 167.

——— Descriptions of new fossil and recent shells of the United States.

In Journal of the Academy of Natural Sciences of Philadelphia, new series, vol. I, Part III, pp. 207–209, 280, pl. xxxix.

——— Observations on the geology of a part of East Florida, with a catalogue of recent shells of the coast.

In American Journal of Science. New Haven, B. Silliman and J. D. Dana, 1846. New series, vol. II, pp. 36–45, 393–398, 1846.

Coues (Elliott, M. D.). Notes on the Natural History of Fort Macon, N. C., and Vicinity.

In Academy of Natural Sciences of Philadelphia; Proceedings of, 1871, pp. 120–148. This includes a synopsis of the species collected, and enumerates the species collected earlier by Dr. William Stimpson, but which were not found by Dr. Coues. A supplementary list appears in the same Proceedings for 1878, pp. 301–303.

Dall (William Healey). Reports on the results of dredging, under the supervision of Alexander Agassiz, in the Gulf of Mexico and in the Caribbean Sea, 1877–'79, by the U. S. Coast Survey steamer *Blake*, Lieutenant-Commander Sigsbee, U. S. N., and Commander J. R. Bartlett, U. S. N., commanding. XV. Preliminary report on the Mollusca. Bulletin of the Museum of Comparative Zoology at Harvard College. Cambridge, for the Museum, July–December, 1881.

Vol. IX, No. 2, pp. 33–144. 8°. This publication, separately issued as a bulletin, with title on cover, appeared originally in signatures as follows: Pp. 33–48, July 49–64, Aug. 12, 1881; pp. 65–80, Aug. 25, 1881; pp. 81–96, Sept. 26, 1881; 31, 1881; pp. 113–128, Nov. 26, 1881; pp. 129–144, Dec. 5, 1881.

Dall (William Healey). On certain Limpets and Chitons from the deep waters off the eastern coast of the United States.

In U. S. National Museum; Proceedings. Washington, the Museum, April 24, 1882. Vol. v, pp. 400–414. 8°.

——— On a collection of shells sent from Florida by Mr. Henry Hemphill.

In U. S. National Museum; Proceedings. Washington, the Museum, Dec., 1883. Vol. vi, pp. 318–342, pl. x. 8°. The new or specially interesting species signalized by Calkins and Melvill (*q.* r.) are enumerated in this article, besides those sent by Hemphill.

——— Notes on some Floridian land and fresh-water shells, with a revision of the Auriculacea of the eastern United States.

In the same. Vol. viii, pp. 255–289, pl. xvii, xviii, July, 1885.

——— Bulletin of the U. S. Geological Survey, No. 24. List of the marine mollusca, comprising the Quaternary fossils and recent forms from American localities between Cape Hatteras and Cape Roque, including the Bermudas.

Washington, Government Printing Office, 1885. 336 pp. 8°. This publication is essentially an index to the literature relating to the region specified, without synonymy, alphabetically arranged, and accompanied by a short bibliography of the literature referred to, and indications of the geographical range of the species cited.

——— Bulletin of the Museum of Comparative Zoology, at Harvard College. Vol. xii, No. 6. Reports on the results of dredging, under the supervision of Alexander Agassiz, in the Gulf of Mexico (1877–'78), and in the Caribbean Sea (1879–'80), by the U. S. Coast Survey steamer *Blake*, Lieutenant-Commander C. D. Sigsbee, U. S. N., and Commander J. R. Bartlett, U. S. N., commanding. xxix. Report on the Mollusca by W. H. Dall. Part I. Brachiopoda and Pelecypoda.

Cambridge, the Museum, Sept., 1886. Pp. 171–318, plates i–ix. 8°.

——— Bulletin of the Museum of Comparative Zoology, at Harvard College. Vol. xviii. Reports on the results of dredging, [etc.]. xxix. Report on the mollusca, by W. H. Dall. Part II. Gastropoda and Scaphopoda. Cambridge, the Museum, June, 1889.

492 pp., plates x–xl. 8°.

——— Contributions to the Tertiary fauna of Florida, with especial reference to the Miocene silex beds of Tampa and the Pliocene beds of the Caloosahatchie River.

In Transactions of the Wagner Free Institute of Science of Philadelphia, 1889. Folio, with plates. [In press.]

——— Report on the Mollusca collected by the U. S. Fish Commission steamer *Albatross* on her voyage from Chesapeake Bay, Virginia, by way of Magellan Strait to San Francisco, Cal., in 1887–'88. With illustrations.

[In preparation.]

D'Orbigny (Alcide Dessalines). Histoire physique, politique et naturelle de l'île de Cuba. Par M. Ramon de la Sagra [etc.]. Mollusques. Paris, Bertrand, 1853.

2 vols. 8°. Vol. I, 2 l. unp., 264 pp.; vol. II, 2 l. unp., 380 pp. Atlas folio, 1 l., xxix pl., n. d. [1842]. This publication, forming one of Sagra's series, but independently issued in the French language, appeared irregularly as follows: Vol. I, signatures 1–14 in 1841, signatures 15–17 and atlas in 1842; vol. II, signatures 1–7 in 1842, signatures 8–24 in 1847–1853. The two volumes were issued as a whole in 1853, with the latter date on the title-page. There is an edition in Spanish, conformable with the rest of the Spanish series of the work, which the compiler has not been able to consult, but which seems to have a widely different pagination, though the plates are the same.

Dunker (Dr. Wilhelm). Novitates conchologicæ. Mollusca marina. Beschreibung und abbildung neuer oder wenig gekannter meeres conchylien. Cassel, Theo. Fischer, 1858–1870.

144 pp. 4°. 45 pl.

Folin (Léopold, Marquis de). On the mollusca of H. M. S. *Challenger* expedition. The Cæcidæ, comprising the genera Parastrophia, Watsonia, and Cæcum. With a prefatory note by the Rev. Robert Boog Watson, B. A., F. R. S. E., F. L. S., etc.

Ext. Zool. Soc. London; Proceedings for 1879, with bastard title. London, the Society, 1880. Pp. 806–812. 8°.

——— Report on the Cæcidæ collected by H. M. S. *Challenger* during the years 1873–1876.

In "*Challenger* Reports," vol. xv, pp. 681–689, 1886. This is Appendix B to Watson's Report on the Gastropoda of the *Challenger* expedition, *q. v.*

Gould (Dr. Augustus Addison). Descriptions of new genera and species of shells.

In Boston Society of Natural History; Proceedings. Boston, the Society, 1862. Vol. VIII, pp. 280–284. 8°.

——— Otia conchologica. Boston, Gould & Lincoln, 1862.

256 pp. 8°.

——— Report on the invertebrata of Massachusetts, published agreeably to an order of the legislature. Second edition, comprising the mollusca. Edited by W. G. Binney. Boston, Wright & Potter, 1870.

Royal 8°. viii, 524 pp., plates xvi–xxvii, and 405 cuts in the text. The copies of this work, distributed by Dr. Gould's family, have a two-page sketch of his life inserted after Mr. Binney's prefatory remarks.

Gundlach (Don Juan). Apuntes para la fauna Puerto-Riqueña. Quinta parte. B. Molluscos marinos.

In Anales de la Soc. Esp. de Hist. Nat., tomo XII, pp. 441–484, 1883. 8°. The author has had the assistance of Drs. Dunker and Von Martens in the preparation of this list of the shells of Porto Rico, which was preceded by a list of the terrestrial mollusca, printed in the earlier portion of the same volume.

Guppy (R. J. Lechmere). First sketch of a marine invertebrate fauna of the Gulf of Paria and its neighborhood.

Scientific Association of Trinidad; Proceedings. Portofspain, J. Wulff; London, Trübner, Dec., 1877. Vol. II, Part XI, pp. 134–157. 8°.

Guppy (R. J. Lechmere). On the West Indian Tertiary fossils.

In Geological Magazine, decade II, vol. I, Nos. 9 and 10, Sept. and Oct., 1874, pp. 433-454, pl. xvi-xviii. Also a supplement of one page, from the same, Jan., 1875. Extras repaginated and issued with the plates and supplementary leaf, with title "West Indian Tertiary fossils" on cover. Total pp. 22. 8°. London, Trübner, 1874.

Haddon (Prof. Alfred C.). Voyage of H. M. S. *Challenger*. Zoology. Report on the Polyplacophora collected by H. M. S. *Challenger* during the years 1873-1876.

In "*Challenger* Reports," vol. xv, Part XLIII, pp. 1-50, plates i-iii. London, 1886. 4°.

Heilprin (Prof. Angelo). Explorations on the west coast of Florida and in the Okeechobee Wilderness.

In Transactions of the Wagner Free Institute of Science of Philadelphia, vol. I, No. 1, pp. 1-134, May, 1887. Sm. folio, with plates 1-19.

This contains the descriptions of many new species of Tertiary fossils from West Florida, besides other matters of interest.

Higgins (Rev. Henry H.) [and **Marratt** (Frederick P.)]. Free public library, museum, and gallery of art of the borough of Liverpool. Museum report No. 1. Mollusca of the Argo expedition to the West Indies, 1876. Liverpool, D. Marples & Co. [1878].

20 pp. 8°. 1 pl. An important contribution to the geographical distribution of mollusca in the West Indies. The species were chiefly identified by Mr. Marratt.

Holmes (Prof. Francis S.). Post-pleiocene fossils of South Carolina. Charleston, S. C., Russell & Jones, 1858-1860.

vi, 122 pp., xxviii pl. 4°. See also TUOMEY and HOLMES. This work was published in 16 parts, of which 98 pages and 14 plates are devoted to invertebrates. The remainder, an account of the vertebrate fossils, is by Dr. Joseph Leidy, and partly relates to the Eocene formation. In neither this nor the Pliocene volume are the unpaginated sheets with plate references counted above as pages.

Jahrbücher der deutschen malakozoölogischen gesellschaft. Redigirt von Dr. W. Kobelt. Frankfurt am Main, Johannes Alt, 1874-1878.

6 vols. 8°. Also:

——— The same. Frankfurt am Main, Alt & Neumann, 1879.

1 vol. 8°. Also:

——— The same. Frankfurt am Main, Moritz Diesterweg, 1880-1888.

9 vols. 8°. The series closes with the volume for 1888.

Jones (J. Matthew, F. L. S.). Contributions to the natural history of the Bermudas. Part I. Mollusca.

In Nova Scotian Institute of Natural Science; Transactions. Halifax, the Society, 1864. Vol. II, Part II, pp. 14-26. 8°.

Journal de Conchyliologie, comprenant l'étude des animaux, des coquilles vivantes et des coquilles fossiles. Publié sous la direction de M. Petit de la Saussaye. Paris, the editor, 1850-1853.

4 vols. 8°. Also:

Journal de Conchyliologie. Publié sous la direction de MM. Fischer et Bernardi. Paris, Bernardi, 1856 [juillet]-1860 [janvier].

4 vols., 8° [ending the first series], and 4 vols., 8° [forming the second series], or 8 vols. 8°. Also:

Journal de Conchyliologie. Publié sous la direction de MM. Crosse et Fischer. Paris, Crosse, 1861–1888.

[Third series], 28 vols. 8°. Also:

——— Index général et systématique des matières contenues dans les vingt premiers volumes du Journal de Conchyliologie [etc.], 1850–1872. Paris, H. Crosse, 1878.

1 vol., viii, 200 pp. 8°.

[**Krebs** (Henry).] The West Indian marine shells, with some remarks. A manuscript printed for circulation between collectors. By * * *. [Kjöbenhavn.] Printed by W. Laubs' widow and Chr. Jörgensen, Nykjöbing, Falster, 1864.

3 prel. l. unp., 137 pp. 12°. The following mention of the circumstances attending the printing of this extremely rare, anonymously issued, yet scientifically valuable pamphlet occurs in a letter from the author, dated Dec. 1, 1884: "I beg to inform you that the [above pamphlet] was only printed in 20 copies, of which 3 were, according to law, delivered to the public libraries [of Copenhagen], 7 were lost in transmitting them to St. Thomas, 3 went to the universities of Sweden and Norway, and a few [were] given to friends." "Consequently there are none for sale. My friends tease me that the book is the costliest they know, on account of a copy has been sold in Altona, at auction, for 10 Rd." A copy presented by the author to Mr. Thomas Bland, and given by that gentleman to Mr. John H. Redfield, has, with great liberality, been presented by the latter to the library of the U. S. National Museum.

——— Remarks on some species of West Indian marine shells in the museum of Amherst College.

In Lyceum of Natural History of New York; Annals. New York, the society, 1866. Vol. VIII, 1866, pp. 394–398. 8°.

——— Catalogue of marine mollusks collected in the Bahama Islands in November, 1866.

In Lyceum of Natural History of New York; Annals. New York, the society, 1866. Vol. VIII, 1866, pp. 427–431. 8°.

Kurtz (Lieut. John D.). Catalogue of recent marine shells found on the coasts of North and South Carolina. Portland, David Tucker, 1860.

9 pp. 8°. See also STIMPSON and KURTZ.

Magasin de zoologie. Première année, première partie, classe V. Mollusques. Planches 1 à 40. Paris, Lequien fils, 1831.

42 l. unp., 40 pl. 8°. Also:

——— Journal destiné à établir une correspondance entre les zoologistes de tous les pays et à leur faciliter les moyens de publier les espèces nouvelles ou peu connues qu'ils possèdent. Publié par F. E. Guérin-Méneville [etc.]. Deuxième section. Mollusques et zoophytes. Paris, A. Bertrand, 1831–1839.

2 vols. Vol. I [texte], 206 l. unp.; vol. II [planches], 119 pl. 8°. Also:

Magasin de zoologie, d'anatomie comparée et de paléontologie: recueil destiné à faciliter aux zoologistes de tous les pays les moyens de publier leurs travaux, les espèces nouvelles qu'ils possèdent, et à les tenir surtout au courant de nouvelles découvertes et des progrès de la science, par M. F. É. Guérin-Méneville. Deuxième section.

Magasin de zoologie, d'anatomie comparée et de paléontologie—Cont'd. Mollusques et zoophytes. Années 1839 à 1844. Paris, veuve Bertrand, 1844.

2 vols. [Texte] 250 l. unp. 8°. [Planches] IV pp., 150 pl. 8°. This publication seems to have been printed with leaves numbered only to correspond with the plates or with the separate articles, which were afterward divided up in sections, each class being bound and sold separately.

Malakozoologische Blätter. Als Fortsetzung der Zeitschrift für Malakozoologie. Herausgegeben von Karl Theodor Menke, in Pyrmont, und Dr. Louis Pfeiffer, in Cassel. Cassel, Theodor Fischer, 1854–1862.

8 vols. 8°. Also:

——— The same. Herausgegeben von Dr. Louis Pfeiffer, in Cassel. Cassel, Theodor Fischer, 1862–1872.

10 vols. 8°. Also:

——— The same. Herausgegeben von Dr. Louis Pfeiffer, in Cassel, und Dr. W. Kobelt, in Schwanheim. Cassel, Theodor Fischer, 1872–1874.

3 vols. 8°. Also:

——— The same. Herausgegeben von Dr. Louis Pfeiffer, in Cassel, Cassel, Theodor Fischer, 1875–1877.

3 vols. 8°. Also:

——— Dr. Ludwig Pfeiffer's malakozoologische Blätter für 1878. Fortgesetzt von S. Clessin. Cassel, Theodor Fischer, 1878.

1 vol. 8°. Also:

——— Malakozoologische Blätter. Als Fortsetzung der Zeitschrift für Malakozoologie. Herausgegeben von S. Clessin. Neue Folge, erster[–zehnter] Band. Cassel, Theodor Fischer, 1879–1888.

10 vols. 8°. The earlier volumes of this series carried the date of issue on each signature. Later volumes are without it, and there is no means of determining the date of issue, which often was not within the year to which the volume ostensibly refers.

Melvill (James Cosmo, A. M., F. L. S.). List of the mollusca obtained in South Carolina and Florida, principally in the island of Key West, 1871–1872.

In Journal of Conchology. Leeds, J. Taylor, 1881. Vol. III, Nos. 5, 6, pp. 155–173. 12°. This catalogue contains many erroneous identifications.

Mörch (Otto Andreas Lowson). Catalogue of the West India shells in the collection of Dr. C. M. Poulsen, Kastanievei 5, Copenhagen. Copenhagen, Bianco Luno, 1878.

16 pp. 8°.

Nachrichtsblatt der deutschen malakozoologischen Gesellschaft. Unter mitwirkung von D. F. Heynemann; redigirt von Dr. W. Kobelt. Frankfurt am Main, W. Kuchler, 1869.

1 vol. sm. 8°. Also:

——— The same. Frankfurt am Main, J. D. Sauerländer, 1870–1871.

2 vols. 8°. Also:

Nachrichtsblatt, etc.—Continued.

——— The same. Redigirt von Dr. W. Kobelt. Frankfurt am Main, J. D. Sauerländer, 1872.

1 vol. 8°. Also:

——— The same. Redigirt von Dr. W. Kobelt und D. F. Heynemann. Frankfurt am Main, Johannes Alt, 1873.

1 vol. 8°. Also:

——— The same. Redigirt von Dr. W. Kobelt. Frankfurt am Main, Johannes Alt, 1874–1877.

4 vols. 8°. Also:

——— The same. Frankfurt am Main, Alt & Neumann, 1878–1879.

2 vols. 8°. Also:

——— - The same. Frankfurt am Main, Moritz Diesterweg, 1880–1888.

9 vols. 8°.

Nautilus (The). A journal devoted to the interests of conchologists. Established in 1886 as "The Conchologist's Exchange." Vol. III[I], No. 1, May, 1889. Philadelphia, published monthly by H. A. Pilsbry and W. D. Averell. 8°. 1889.

The first issue under the above title, cited above, comprises iv, 12 pp.

Norman (Rev. A. M.). Presidential address delivered at the annual meeting of the Tyneside Naturalists' Field Club, May 27, 1881, with appendices on the fauna of the abysses of the ocean. Newcastle-upon-Tyne, John Bell, 1883.

8°. 68 pp. Appendix C contains a list of all the animals at that time recorded as obtained from the North Atlantic Ocean at a greater depth than 1,000 fathoms.

Pelseneer (Paul, D. Sc.). The voyage of H. M. S. *Challenger*. Zoology. Report on the Pteropoda. Part I. The Gymnosomata.

In "*Challenger* Reports," vol. XIX, pp. 1–74, plates i–iii. London, 1887. 4°.

——— (The same.) Part II. The Thecosomata.

In the same, vol. XXII, pp. 1–132, plates i, ii. London, 1888. 4°.

——— (The same.) Part III. Anatomy.

In the same, vol. XXIII, pp. 1–97, plates i–v. London, 1888. 4°.

Pfeiffer (Dr. Louis.) Bericht über die ergebnisse meiner reise nach Cuba im winter 1838–'39.

In Wiegmann's Archiv für Naturgeschichte, 1839, vol. I, pp. 346–358.

——— Uebersicht der im Januar, Februar und März 1839 auf Cuba gesammelten Mollusken.

In same, 1840, vol. I, pp. 250–261.

Ravenel (Dr. Edmund). Catalogue of the recent and fossil shells in the cabinet of the late Edmund Ravenel. Charleston, S. C., Walker, Evans & Cogswell, 1875.

68 pp. 12°.

Roemer (Dr. Ferdinand). Texas; mit besonderer rücksicht auf deutsche auswanderung und die physischen verhältnisse des landes nach eigener beobachtung geschildert; mit einem naturwissenschaftlichen anhange. Bonn, Adolph Marcus, 1849.

xvi, 464 pp. 8°. 1 map. List of new species in Binney's Bibliography N. Am. Conchology, Part II, pp. 11–12.

Say (Thomas). The complete writings of Thomas Say on the conchology of the United States. Edited by W. G. Binney. New York, H. Baillière, 1858.

8°. vi, 252 pp., pl. i-lxxv.

A reprint of Say's scattered papers and descriptions.

Simpson (Charles Torrey). Contributions to the mollusca of Florida.

In Davenport (Iowa) Academy of Natural Sciences; Proceedings of, vol. v, pp. 45–72, 63*–72*. 8°. Pages 45–48 appeared Aug. 25, 1887; pages 49–56, Nov. 4, 1887; pages 57–72, Feb., 1889, and the remainder in March, 1889.

Smith (Edgar Albert, F. Z. S.). The voyage of H. M. S. *Challenger*. Zoology. Report on the Lamellibranchiata collected by H. M. S. *Challenger* during the years 1873–1876.

In "*Challenger* Reports," vol. XIII, pp. 1–341, plates i–ixxv. London, 1885. 4°.

Stearns (Robert Edwards Carter). Descriptions of new species of marine mollusks from the coast of Florida.

Ext. Boston Society of Natural History; Proceedings, vol. XV, pp. 21–24, Jan. 17, 1872. 8°. 4 pp.

——— On a new species of Pedipes from Tampa Bay, Florida.

Ext. Boston Society of Natural History; Proceedings, vol. XIII, pp. 108–109, 1869. 1 leaf. 8°. Headed "Conchological Memoranda, No. 4."

——— Descriptions of new marine shells from the west coast of Florida.

Ext. Academy of Natural Sciences of Philadelphia; Proceedings for 1873, pp. 344–347, 1873. 8°. 4 pp.

Stimpson (Dr. William). Descriptions of new shells.

In Boston Society of Natural History; Proceedings, vol. IV, pp. 112–114, 1851.

——— and **Kurtz** (Lieut. John D.). Descriptions of new shells.

In Boston Society of Natural History; Proceedings, vol. IV, pp. 114–115, 1851.

Tryon (George Washington), jr. American marine conchology; or, descriptions of the shells of the Atlantic coast of the United States from Maine to Florida. Philadelphia, the author, 1873–1874.

208 pp., 44 pl. 8°. Issued in six parts, Nov., 1873, to Nov., 1874.

Tuomey (Michael) and **Holmes** (Francis S.). Pleiocene fossils of South Carolina; containing descriptions and figures of the Polyparia, Echinodermata, and Mollusca. Charleston, S. C., Russell & Jones, 1855–1857.

1 vol. xvi, 152 pp., 32 pl. 4°. Issued in sixteen parts; of which six of eight pages and two plates each appeared in 1855, the remainder with title, etc., in 1856. See also HOLMES (F. S.).

Verrill (Prof. Addison E.). Report upon the invertebrate animals of Vineyard Sound and the adjacent waters, with an account of the physical characters of the region.

In [First] Report of the U. S. Commission of Fish and Fisheries, 42nd Congress. 2nd session, Senate Miscellaneous Document No. 61. Washington, Government Printing Office, 1873. 8°. Pp. 296–778, plates i–xxxviii. A separate edition was issued by the author. The original volume is sometimes referred to as the Report of the U. S. Commissioner of Fish and Fisheries for 1871–'72.

Verrill (Prof. Addison E.). List of deep-water and surface Mollusca taken off the east coast of the United States by the U. S. Fish Commission steamers *Fish Hawk* and *Albatross*, 1880–1883.

Ext. Connecticut Academy of Sciences; Transactions. New Haven, the society, July, 1884. Vol. VI, pp. 263–290. 8°.

——— Results of the explorations made by the steamer *Albatross* off the northern coast of the United States in 1883.

In Report of the Commissioner of Fish and Fisheries for 1883. Washington, Government Printing Office, 1885. Pp. 503–601, plates i–xliv. Separate copies were also printed for the author.

——— Catalogue of marine mollusca added to the fauna of the New England region during the past ten years.

In Transactions of the Connecticut Academy of Sciences, V, pp. 447–588, plates xlii–xliv, lvii, lviii. 8°. 1882. Separates distributed by the author.

——— Second catalogue of mollusca, recently added to the fauna of the New England coast and the adjacent parts of the Atlantic, consisting mostly of deep-sea species, with notes on others previously recorded.

In the same; vol. VI, pp. 139–294, plates xxviii–xxxii. 8°. 1884. Separate copies were issued.

——— Third catalogue of mollusca, recently added to the fauna of the New England coast and the adjacent parts of the Atlantic, consisting mostly of deep-sea species, with notes on others previously recorded.

In the same; vol. VI, pp. 395–452, plates xlii–xliv. 8°. 1884. Separate copies were issued.

Watson (Rev. Robert Boog). Mollusca of H. M. S. *Challenger* expedition. Parts I–XX, 1879–1883. Preliminary report to Prof. Sir C. Wyville Thomson [etc.].

Ext. Linnean Society Journal. Zoology. London, the Society, 1879–1883. Vols. XIV–XVII, 1879–1883. 8°. See also FOLIN (L. de).

The separate parts appeared as follows:

Part I.—The Journal, vol. XIV, No. 78, pp. 506–507; read Nov. 21, 1878; published April 23, 1879.

II.—The Journal, vol. XIV, No. 78, pp. 508–529; read Nov. 21, 1878; published April 23, 1879.

III.—The Journal, vol. XIV, No. 78, pp. 586–605; read Dec. 5, 1878; published April 23, 1879. The preceding parts in one cover. Title on cover and bastard title. 8°. London, Taylor & Francis, 1879. Original pagination preserved.

IV.—The Journal, vol. XIV, No. 80, pp. 694–716; read June 5, 1879; published Sept. 2, 1879. Covers and bastard title as in the preceding.

V.—The Journal, vol. XV, No. 82, pp. 88–126; read April 18, 1880; published July 31, 1880. This and succeeding two parts have no title on cover or elsewhere.

VI.—The Journal, vol. XV, No. 84, pp. 218–230; read April 15, 1880; published Nov. 20, 1880.

VII.—The Journal, vol. XV, No. 85, pp. 246–274; read Dec. 9, 1880; published March 25, 1881.

VIII.—The Journal, vol. XV, No. 86, pp. 388–412; read March 3, 1881; published Sept. 29, 1881. This part has bastard title, but none on cover.

Watson (Rev. Robert Boog)—Continued.

Part IX.—The Journal, vol. xv, No. 87, pp. 413–455; read June 2, 1881; published Oct. 4, 1881. This part has no title.

X.—The Journal, vol. xv, No. 88, pp. 458–475; read June 16, 1881; published Nov. 3, 1882. No title.

XI.—The Journal, vol. xvi, No. 91, pp. 247–254; read Dec. 15, 1881; published March 8, 1883. No title.

XII.—The Journal, vol. xvi, No. 93, pp. 324–343; read Dec. 15, 1881; published June 12, 1882. This part has bastard title.

XIII.—The Journal, vol. xvi, No. 93, pp. 358–372; read March 16, 1881; published June 12, 1882. This part has bastard title.

XIV.—The Journal, vol. xvi, No. 93, pp. 372–392; read March 16, 1882; published June 12, 1882. This part has bastard title.

XV.—The Journal, vol. xvi, No. 96, pp. 594–611; read June 15, 1882; published March 10, 1883. This part has bastard title.

XVI.—The Journal, vol. xvii, No. 97, pp. 26–40; read Nov. 16, 1882; published March 24, 1883. This part has bastard title.

XVII.—The Journal, vol. xvii, No. 99, pp. 112–130; read March 1, 1883; published July 31, 1883. This part has bastard title.

XVIII.—The Journal, vol. xvii, No. 101, pp. 284–293; read March 15, 1883; published Oct. 20, 1883.

XIX.—The Journal, vol. xvii, No. 101, pp. 319–340; read May 3, 1883; published Oct. 20, 1883.

XX.—The Journal, vol. xvii, No. 101, pp. 341–346; read June 21, 1883; published Oct. 20, 1883.

Parts XVIII–XX issued in one cover; title on the cover. London, Linnean Society [1883].

——— The voyage of H. M. S. *Challenger*. Zoology. Report on the Scaphopoda and Gasteropoda collected by H. M. S. *Challenger* during the years 1873–1876.

In "*Challenger* Reports," vol. xv, Part XLII, pp. i–v, 1–756, plates i–l, with an Appendix, B, pp. 681–689, plates i–iii, on the *Cæcidæ* by Léopold, Marquis de Folin. London, 1885. 4°.

Zeitschrift für Malakozoologie. Herausgegeben von Karl Theodor Menke. Hannover, Hahn, 1844–1845.

2 vols. 8°. Also:

——— Herausgegeben von Karl Theodor Menke und Dr. Louis Pfeiffer. Cassel, Theodor Fischer, 1846–1853.

8 vols. 8°. See also MALAKOZOOLOGISCHE BLÄTTER.

SKETCH OF GENERAL ARRANGEMENT.

A.—CLASS BRACHIOPODA.

I. Order Arthropomata.

II. Order Lyopomata.

B.—CLASS PELECYPODA.

I. Order Prionodesmacea.
1. Suborder Ostracea.
2. Suborder Anomiacea.
3. Suborder Pectinacea.
4. Suborder Mytilacea.
[5. Suborder Naiadacea.
6. Suborder Trigoniacea].
7. Suborder Arcacea.
8. Suborder Nuculacea.
9. Suborder Solenomyacea.

II. Order Teleodesmacea.
1. Suborder Carditacea.
2. Suborder Leptonacea?

II. Order Teleodesmacea—Continued.
3. Suborder Lucinacea.
4. Suborder Chamacea.
5. Suborder Cardiacea.
6. Suborder Veneracea.
7. Suborder Tellinacea.
8. Suborder Mactracea.

III. Order Anomalodesmacea.
1. Suborder Anatinacea.
2. Suborder Myacea.
3. Suborder Solenacea?
4. Suborder Ensiphonacea.
5. Suborder Adesmacea.

C.—CLASS SCAPHOPODA

I. Order Solenoconchia.

D.—CLASS GASTROPODA.

aa. SUBCLASS ANISOPLEURA.

A. *Superorder Euthyneura.*

I. Order Pteropoda.
1. Suborder Thecosomata.
2. Suborder Gymnosomata.

II. Order Opisthobranchiata.
1. Suborder Tectibranchiata.

[III. Order Nudibranchiata.]

IV. Order Pulmonata.
1. Suborder Stylommatophora.
2. Suborder Basommatophora.

B. *Superorder Streptoneura.*

I. Order Ctenobranchiata.
1. Suborder Orthodonta.
a. Superfamily Toxoglossa.
b. Superfamily Rhachiglossa.
2. Suborder Streptodonta.
a. Superfamily Ptenoglossa.
b. Superfamily Gymnoglossa.

I. Order Ctenobranchiata—Continued.
2. Suborder Streptodonta—Cont'd.
c. Superfamily Taenioglossa.
d. Superfamily Docoglossa.
e. Superfamily Rhiphidoglossa.
f. Superfamily Zygobranchia.

bb. SUBCLASS ISOPLEURA.

C. *Superorder Polyconchæ.*

I. Order Polyplacophora.
a. Superfamily Eochitonia.
b. Superfamily Opsichitonia.

E.—CLASS CEPHALOPODA.

I. Order Dibranchiata.
1. Suborder Octopoda.
2. Suborder Sepiophora.

:.—The reader will understand that this sketch does not pretend to complete- ɪcept for the following tables.

ABBREVIATIONS FOR LOCALITIES.

ERRATUM.

The arrangement sketched on page 26 and followed in the tables was made out before the completion of my studies of the classification of the Pelecypods. These being since completed, two changes would follow in the arrangement. The suborder *Solenacea* would be transferred to the order *Teleodesmacea*, following the *Tellinacea*, and the suborder *Solenomyacea* would be transferred to the *Anomalodesmacea*. It is also probable that the *Isocardiacea* should be raised to subordinal rank.

W. H. DALL.

AUGUST 19, 1889.

Char. H.	Charlotte Harbor, Fla.	St. Bart.	St. Bartholomew.
Charl.	Charleston, S. C.	S. Car.	South Carolina.
Chesap.	Chesapeake Bay.	St. Cruz.	St. Croix or Santa Cruz.
C. Rom.	Cape Romano, Fla.	St. Dom.	Santo Domingo.
C. Sable.	Cape Sable, Nova Scotia.	St. J.	St. John.
Cub.	Cuba.	St. M.	Saint Martin.
Cul.	Culebra.	St. Thos.	St. Thomas.
Cur.	Curaçoa.	St. Vin.	St. Vincent.
Dom.	Dominica.	Tex.	Texas.
E. Fla.	East Florida.	Tort.	Tortola.
Eur.	Europe.	Trin.	Trinidad.
Fernand.	Fernandina, Fla.	V.	Viéque.
Fla.	Florida.	Va.	Virginia.
Ga.	Georgia.	V. Cruz.	Vera Cruz.
Gtm.	Guatemala.	VD.	Van Dyck's Island.
Guad.	Guadalupe.	Ven.	Venezuela.
Gulf, or G. Mex.	Gulf of Mexico.	Vg. I.	Virgin Islands.
Hatt.	Cape Hatteras.	W.	Water Island.
Hond.	Honduras.	W. Fla.	West Florida.
Hait.	Haiti.	Yuc.	Yucatan.
Jam.	Jamaica.	Z.	Ziech.

TABLE I. A.—*List of Brachiopoda.*

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Class BRACHIOPODA.					
	Order ARTHROPOMATA Owen.					
	Family TEREBRATULIDÆ.					
	Genus TEREBRATULA Llhwyd.					
1	T. cubensis Pourtalès	39	6, 10	27	80/400	Fla. Reefs...
2	T. Bartlettii Dall.	6	4*a–c*	40	70/250	Gulf of Mex.
3	T. incerta Davidson	6	6, 6*a*	10.5	189/1850	Gulf of Mex.
	Genus TEREBRATULINA Orbigny.					
4	T. Cailleti Crosse	39	8, *yo.*	10	30/296	Fernandina .
5	T. septentrionalis Couth	49	1, 2	22	4/83	Halifax .....
	Family EUDESIIDÆ.					
	Genus EUDESIA King.					
6	E. floridana Pourtalès	39	9, 11	23	118/310	Sand Key ...
7	E. cranium Müller	....	.....	.....	30/1360	Norway .....
	Genus MEGERLIA King.					
8	M. disparilis Dall.	....	.....	2.6	108/110	.....
	Family MEGATHYRIDÆ.					
	Genus CISTELLA Gray.					
9	C. Barrettiana Davidson	....	.....	5	80/400	Fla. Keys ...
10	C. lutea Dall	....	.....	6.5	30/247	Hatteras ....
11	C. Schrammi C. and F	....	.....	.....	100	Gulf of Mex.
	Family PLATIDIIDÆ.					
	Genus PLATIDIA Costa.					
12	P. seminula Philippi	49	3, 4	4.5	16/291	Hatteras ....
12*a*	var. radiata Dall	....	.....	.....	8/218	San Diego...
	Family THECIDIIDÆ.					
	Genus THECIDIUM Defrance.					
	T. Barretti Woodward	6	2	.....	88/1063	Gulf of Mex.
	T. mediterraneum Sowerby	49	11	5.5	.....	Medit .....
	Family RHYNCHONELLIDÆ.					
	Genus ATRETIA Jeffreys.					
15	A. gnomon Jeffreys	....	.....	6	1178/2021	Labrador....

TABLE I. A.—*List of Brachiopoda.*

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	...	....	†	†	†	.....	....	†	....	?	.....	Barbados....	Miocene. ?
....	...	....	...	....	.....	†	....	†	....	....	.....	Barbados....	
....	...	....	...	....	†	.....	....	†	....	....	.....	Bequia.....	
....	...	....	†	†	†	*†	†	†	....	....	.....	Rio	
†	?	....	...	....	.....	.....	....	.....	....	†	?	N. Jersey ? ..	Pliocene.
....	...	....	...	....	†	†	....	†	....	....	.....	Barbados....	
†?	...	....	...	....	.....	.....	....	.....	....	†	.....	Rhode Island	Pliocene.
....	...	....	...	....	?	.....	....	†	....	....	.....	Barbados....	
....	...	....	...	....	†	†	....	†	....	....	.....	Barbados....	
....	...	†	...	....	*	.....	....	†	....	....	.....	Barbados....	
....	...	....	...	....	.....	†	....	†	....	....	.....	Barbados....	
....	...	*	†	....	†	.....	....	†	....	†	†	Barbados....	Pliocene.
....	...	....	...	....	.....	.....	....	†	....	....	*	Santa Cruz..	
....	...	....	...	....	†	.....	....	†	....	....	.....	Barbados....	
....	...	....	...	....	†	.....	....	†	....	†*	.....	Barbados....	Pliocene.
†	†	†	...	†	.....	.....	....	†?	....	†	.....	Florida Str..	

TABLE I. A.—*List of Brachiopoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth	Northern extreme range.
	Order LYOPOMATA Owen.					
	Family CRANIIDÆ.					
	Genus CRANIA Retzius.					
16	C. Pourtalesii Dall	....	.....	7	88/116	Fernandina.
	Family DISCINIDÆ.					
	Genus DISCINA Lamarck.					
	Subgenus **Discinisca** Dall.					
17	D. atlantica King	....	.....	5	200/2030	Baffin's Bay.
18	D. antillarum Orbigny	....	.....	10	18/294	Fernandina.
	Family LINGULIDÆ.					
	Genus GLOTTIDIA Dall.					
19	G. antillarum Reeve	....	.....	6.2	0/16	Cuba
19*a*	var. pyramidata Stimpson	....	.....	.....	0/20	Chesap. Bay.

TABLE I. A.—*List of Brachiopoda*—Continued.

N. J.	Va.	Hat.	Ga	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Ber. mu. da.	Eur.	West Am.	Southern. extreme range.	Range in time.
....	...	....	†	†	†	.....	†	†	....	?	.....	St. Vincent..	
†	†	....	†	....	.....	.....	....	†	....	†	.....	Australia....	
....	...	....	†?	....	.....	.....	....	*	....	....	.....	Martinique..	
....	...	....	...	....	?	?	?	*	....	....	?	Martinique..	
....	*	*	*	*	*	*	?	?	....	....	.....	Florida	

TABLE II. B.—*List of Pelecypoda.*

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Class PELECYPODA.					
	Order PRIONODESMACEA.					
	Suborder OSTRACEA.					
	Family OSTREIDÆ.					
	Genus OSTREA Linné.					
1	O. virginica Gmelin	....	.....	.....	.....	P. E. Island..
2	O. frons Linné	....	.....	.....	.....	Jupiter Inlet
3	O. cristata Born	....	.....	.....	.....	Tampa.....
4	O. equestris Say	....	.....	.....	.....	N. Carolina..
	Suborder ANOMIACEA.					
	Family ANOMIIDÆ.					
	Genus ANOMIA Linné.					
5	A. simplex Orbigny	53	1, 2	.....	$\frac{0}{1}$	Cape Sable..
6	A. aculeata Linné	53	5–8	.....	$\frac{0}{6}$	Arctic Ocean
	Genus PLACUNANOMIA.					
7	P. rudis Broderip	....	.....	.....	.....	Cedar Keys..
	Suborder PECTINACEA.					
	Family DIMYIDÆ.					
	Genus DIMYA Rouault.					
8	D. argentea Dall	4	5*a–b*	10.5	$\frac{73}{148}$	Hatteras ....
	Family SPONDYLIDÆ.					
	Genus PLICATULA Law.					
9	P. ramosa Lamarck	....	.....	.....	.....	Hatteras ....
	Genus SPONDYLUS Linné.					
10	S. spathuliferus Sow	....	.....	.....	.....	Jupiter Inlet
11	S. Gussoni Costa	....	.....	.....	$\frac{69}{640}$	Gulf of Mex.
	Family PECTINIDÆ.					
	Genus PECTEN Müller.					
	Subgenus **Janira** Schum.					
12	J. ziczac Linné	....	.....	.....	.....	Tampa.....
13	J. hemicyclica Ravenel	6	5*yo*	4.0	.....	Hatteras ....

TABLE II. B.—*List of Pelecypoda.*

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extr me range.	Range in time.
*	*	*	*	*	*	*	*	*	....	....	....	Florida Keys	Pliocene.
....	..	....	..	*	*	*	....	*	....	....	....	Barbados....	
....	.	....	..	....	*	*	....	*	....	....	....	Martinique ..	
...	..	*	*	*	....	*	....	....	....	....	....	Charlotte H .	
*	*	*	*	*	*	*	*	*	*	....	....	Martinique ..	
*	*	*	..	....	....	....	....	....	....	*	....	Cape Fear...	
....	..	....	..	....	*	*	....	*	*	....	....	Guadalupe ..	
....	..	†	..	....	....	....	....	†	....	....	....	Barbados....	? Pliocene.
*	*	*	*	*	*	*	*	*	....	....	....	Barbados....	
....	..	....	..	*	*	*	*	*	*	....	....	Guadalupe ..	
....	..	....	..	....	....	....	†	†	....	†	....	West Indies .	
....	..	....	..	....	*	*	....	*	*	....	....	Guadalupe ..	
....	..	*	..	*	*†	*†	....	*	....	....	....	Florida Str..	Pliocene.

TABLE II. B.—*List of Pelecypoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Subgenus **Amusium** Schum.					
14	A. Mortoni Say	....	.....	100.0	30/60	Gulf of Mex.
15	A. Dalli Smith	4 40	1*a–b* 6	62.0	218/1691	Bermuda....
	Section PROPEAMUSIUM Greg.					
16	A. Pourtalesianum Dall	5	12	.....	13/805	Cedar Keys..
17	var. *striatulum* Dall	....	.....	.....	138/424	Santa Cruz..
18	var. marmoratum Dall	4	3	12.0	13/805	.....
19	A. cancellatum Smith	5	1*a*, 2	26.0	138/1691	Charlotte H.
20	A. Holmesii Dall	5	5, 11	12.0	199/273	Fernandina .
21	A. Sayanum Dall	5	3, 9	15.5	150/400	Florida Str..
	Subgenus **Pecten** s. s.					
22	P. magellanicus Gmelin	70	2	300.0	1/169	Labrador....
23	P. irradians Lamarck	53	11	75.0	.....	Nova Scotia .
24	var. dislocatus Say	....	.....	40.0	.....	Hatteras ....
25	P. nucleus Born	....	.....	25.0	.....	Florida Keys
26	P. exasperatus Sowerby	....	.....	.....	.....	Hatteras ....
27	P. ornatus Lamarck	....	.....	.....	.....	Cedar Keys..
28	P. antillarum Recluz	....	.....	.....	.....	Key West ...
29	P. effluens Dall	42	9	26.0	85/300	Fernandina .
30	P. phrygium Dall	40	1	36.5	50/792	Hatteras ....
31	P. glyptus Verrill	....	.....	60.0	69/186	Rhode Island
32	P. imbricatus Gmelin	....	.....	.....	.....	Tortugas ....
33	P. nodosus Linné	....	.....	.....	.....	Hatteras ....
34	var. fragosus Conrad	....	.....	.....	.....	Cedar Keys..
	Section PSEUDAMUSIUM Ad.					
35	P. imbrifer Loven	4 64	4*a–b* 142	12.5	30/630	Arctic Sea...
36	P. reticulus Dall	5	8, 10	7.0	82/124	Hatteras ....
37	P. thalassinus Dall	....	.....	8.5	32/317	Rhode Island
38	P. leptalens Verrill	....	.....	7.0	142	.....
39	P. fragilis Jeffreys	....	.....	.....	656/1750	Arctic Sea...
40	P. striatus Müller	....	.....	.....	.....	Norway .....
41	P. Sigsbeei Dall	4	2	11.5	158	Florida Str..
42	P. vitreus Gmelin	64	141	.....	50/600	Arctic Ocean.
43	P. strigillatus Dall	42	2	.....	294/1181	Fernandina .
44	P. undatus Verrill	46	21	19.0	1423/1425	N. Atlantic..

TABLE II. B.—*List of Pelecypoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	....	..	....	....	*†	....	†	....	....	....	Haiti	Miocene.
....	..	....	..	....	....	†	....	†	†	....	....	Barbados....	
....	..	....	..	†	†	*†	....	†	....	....	....	Grenada.....	
....	..	....	..	....	....	....	....	†	....	....	....	St. Vincent..	
....	..	....	..	†	†	*†	....	†	....	....	....	Grenada	
....	..	....	..	....	†	*	....	†	†	....	....	St. Vincent..	
....	..	....	†	....	....	....	....	†	....	....	....	Barbados....	
....	..	....	..	....	†	....	....	†	....	....	....	Saba	
*	*	*	..	....	....	....	....	....	....	....	....	Hatteras	Miocene.
*	*	*	*	....	....	*	-	....	....	....	....	Tampa	Miocene.
....	..	*	*	*	*	*‡	*	†	....	....	....	Florida Str..	
....	..	....	..	....	*	....	....	†*	....	....	....	Guadalupe ..	
....	..	*	..	*	*	*	....	*	....	....	....	Guadalupe ..	
....	..	....	-	*	*	....	....	*	....	....	....	Barbados....	
....	..	....	..	....	*	....	....	*†	....	....	....	Guadalupe ..	
....	..	....	†	....	†	....	....	†	....	....	....	Cuba.....	
....	..	†	..	....	†	†	....	†	....	....	....	Grenada	
†	..	†	..	....	....	....	....	....	....	....	....	Hatteras	
....	..	....	..	....	*	....	....	*	*	....	....	Trinidad	
....	..	*	..	*	*	*	....	*?	....	....	....	Florida Keys	Pliocene.
....	..	....	..	....	....	†	....	*	....	....	....	Guadalupe ..	
†	..	....	..	....	....	....	....	....	....	†	....	.....	
....	..	†	..	....	....	....	....	†	....	....	....	Barbados....	
....	..	*†	..	....	†	....	....	†	....	....	....	Barbados....	
....	..	†	..	....	....	....	....	....	....	....	....	Hatteras	
....	..	†	..	....	....	....	....	....	....	†	....	Hatteras	
†?	..	....	..	....	....	....	....	....	....	†	....	Rhode Island	
....	..	....	..	....	†	....	....	†	....	....	....	Cuba.....	
†?	..	....	..	....	....	†	....	....	....	†	?	Patagonia...	
....	..	....	†	....	....	†	....	†	....	†	....	Cuba.....	
†	..	....	..	....	....	....	....	....	....	....	....	N. lat. 37°...	

TABLE II. B.—*List of Pelecypoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Genus HINNITES Defrance.					
45	*H. Adamsi* Dall	5	6	28.0	573	N. Atlantic..
	Family LIMIDÆ.					
	Genus LIMA Bruguière.					
46	L. squamosa Lamarck	....	.....	.....	.....	Sarasota ....
47	L. tenera Sowerby	....	.....	.....	.....	Cedar Keys..
48	L. scabra Born	....	.....	.....	.....	Hatteras ....
49	L. albicoma Dall	....	.....	8.0	$\frac{14}{121}$	Fla. Keys....
50	L. hians Gmelin	....	.....	.....	$\frac{15}{13}$	Florida Str..
51	L. inflata Lamarck	....	.....	.....	.....	Hatteras ....
	Subgenus **Limatula** S. Wood.					
52	L. setifera Dall	....	.....	5.75	$\frac{52}{480}$	Hatteras ....
53	L. subauriculata Montagu	....	.....	.....	$\frac{6}{542}$	Arctic Sea...
54	L. confusa Smith	....	.....	.....	$\frac{21}{1480}$	N. Atlantic..
55	L. laminifera Smith	....	.....	.....	$\frac{220}{498}$	Florida Str..
	Genus LIMÆA Bronn.					
56	L. Bronniana Dall	....	.....	3.1	$\frac{18}{100}$	Hatteras ....
57	var. lata Dall	....	.....	5.2	$\frac{224}{804}$	Fernandina .
	Suborder MYTILACEA.					
	Family AVICULIDÆ.					
	Genus AVICULA Lamarck.					
58	A. atlantica Lamarck	....	.....	.....	$\frac{10}{180}$	Hatteras ....
59	A. nitida Verrill	....	.....	.....	$\frac{28}{192}$	Rhode Island
	Genus MARGARITIPHORA Megerle.					
60	M. radiata Lamarck	....	.....	.....	.....	Bermuda ....
	Genus PERNA Bruguière.					
61	P. obliqua Lamarck	....	.....	.....	.....	St. Augustine
62	P. ephippium Lamarck	....	.....	.....	.....	Bermuda ....
	Genus PINNA Linné.					
63	P. muricata Linné	....	.....	.....	.....	N. Carolina..
64	P. seminuda Lamarck	....	.....	.....	.....	Hatteras ....
65	P. carnea Gmelin	....	.....	.....	.....	Hatteras ....

TABLE II. B.—*List of Pelecypoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	....	..	....	....	....	....	†	....	?†	....	St. Vincent..	
....	..	....	..	....	*	*	....	*†	*	*	....	Barbados....	
....	..	....	..	....	*	*	....	*	....	....	....	Barbados....	
....	..	*	..	....	*	....	....	*	....	....	....	Trinidad	Pliocene.
....	..	....	..	....	†	....	....	†	....	....	....	Barbados....	
....	..	....	..	....	*	....	....	*	....	*	....	Santa Cruz..	
....	..	*	*	....	*	*	....	*	*	*	*	Trinidad	
....	..	†	..	....	†	....	....	†	....	....	....	Barbados....	
....	..	*†	..	....	†	....	....	....	....	†*	....	Florida Str..	Pliocene.
....	..	*	..	†	....	†	....	†	....	†	....	Brazil.....	
....	..	....	..	†	....	....	....	†	....	....	....	Sombrero ...	
....	..	*†	..	†	....	....	....	†	....	....	....	Barbados....	
....	..	....	†	....	†	....	....	†	....	....	....	Cuba.....	
....	..	*†	*	....	*†	*	*	*	....	....	....	Venezuela...	P. Pliocene.
†	..	....	..	....	*	*	....	....	....	?	....	Tortugas....	
....	..	....	*	*	*	*	....	*	*	....	....	Brazil.....	
....	..	....	..	*	*	*	*	*	*	....	....	Guadalupe ..	
....	..	....	..	*	*	....	....	*	*	....	....	Jamaica.....	
....	..	*	*	*	*	*	*	*	....	....	....	Venezuela...	Pliocene.
....	..	*	*	*	*	*	*	*	....	....	....	Guadalupe ..	
....	..	*	..	*	*	....	....	*	....	....	....	Barbados....	

TABLE II. B.—*List of Pelecypoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Family MYTILIDÆ.					
	Genus MYTILUS Linné.					
66	M. edulis Linné	71 54	2 3			Arctic Sea.
67	M. hamatus Say					Rhode Island
68	M. exustus Linné					Charleston
	Genus SEPTIFER Recluz.					
69	S. ——					Tampa Bay
	Genus MODIOLA Lamarck.					
70	M. modiolus Linné	54	4		$\frac{0}{10}$	Arctic Sea.
71	M. tulipa Linné					N. Carolina
	Section BRACHYDONTES Swainson.					
72	M. sulcata Lamarck					Tampa Bay
73	M. plicatula Lamarck	54	1			Nova Scotia.
74	var. semicostata Conrad					St. Augustine
	Section AMYGDALUM Megerle.					
75	M. lignea Reeve					S. Carolina
76	M. polita Verrill & Smith	6 45	3 12	50. 0 33. 0	$\frac{111}{1000}$	N. Atlantic
77	var. sagittata Dall				$\frac{88}{196}$	Cedar Keys
78	M. papyria Conrad					Jupiter Inlet
	Section BOTULINA Dall.					
79	M. opifex Say				$\frac{0}{32}$	Hatteras
	Section BOTULA Mörch.					
80	M. cinnamomea Lamarck				$\frac{0}{14}$	Cape Fear
	Genus LITHOPHAGUS Muhlfeldt.					
81	L. caribæus Philippi					Florida Str.
82	L. antillarum Philippi					Bermuda
83	L. bisulcatus Orbigny					Cedar Keys
84	L. forficatus Ravenel					Cape Fear
	Genus DACRYDIUM Torell.					
85	D. vitreum, Möller				$\frac{0}{1000}$	Arctic
	Genus IDAS Jeffreys.					
	I. argenteus Jeffreys	45	16a	5.5	$\frac{333}{1033}$	N. Atlantic

TABLE II. B.—*List of Pelecypoda*—Coutinued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
*	*	*	..	....	....	....	....	....	....	*	*	N. Carolina..	Pliocene.
*	*	*	*	....	*	*	*	....	....	....	....	Costa Rica ..	
....	..	*	..	*	*	*	*	*	*	....	....	Brazil.....	
....	..	....	..	....	....	*	....	....	....	....	....	.....	
*	*	*	..	....	....	....	....	....	...	*	*	N. Carolina..	Pliocene.
....	..	*	*	*	....	*	....	*	*	....	....	Guadalupe ..	
....	..	....	..	*	*	*	....	*	...	....	....	Barbados....	
*	*	*	*	....	....	....	....	....	....	....	....	Georgia	
....	..	....	*	....	....	*	*	....	....	....	....	Texas.....	
....	..	*	*	...	*	*	....	*	....	....	....	St. Thomas..	
†	..	†	..	....	†	†	....	†	....	†	....	Grenada	
....	..	....	..	....	†	†	....	....	....	....	....	Cape Florida	
....	..	....	..	*	....	*	*	....	....	....	....	Corp. Christi	
....	..	*†	..	....	*	....	*	*	....	....	....	Cuba.....	
....	..	*	..	....	*	*	....	*	....	....	....	Guadalupe ..	
....	..	....	..	....	*	....	....	*	....	....	....	St. Thomas..	
....	..	....	..	....	*	....	....	*	*	....	....	Guadalupe ..	
....	..	....	..	....	*	*	....	*	*	....	....	Guadalupe ..	
....	..	*	..	....	*	*	....	*	....	....	....	Jamaica	
†	†	†	..	†*	*	....	....	*†	....	†	....	Campeche...	
†	..	....	?	....	....	....	....	....	....	†	....	Rhode Island	

TABLE II. B.—*List of Pelecypoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Genus MODIOLARIA Beck.					
87	M. nigra Gray	54	2	.....	9/10	Arctic Sea.
88	M. corrugata Stimpson	53	9	.....	1 1/10	Arctic Sea.
89	M. lateralis Say	6	7, 8	.....	.....	Maine.
	Genus CRENELLA Brown.					
90	C. glandula Totten	53	10	.....	1/10	Arctic Sea.
91	C. decussata Montagu	64	136a	.....	1 1/2	Arctic Sea.
92	C. divaricata Orbigny	----	.....	.....	.....	Hatteras
93	C. fragilis Verrill	----	.....	14.0	70	Chesapeake
	Genus DREISSENSIA Van Ben.					
	Subgenus Mytilopsis Conrad.					
94	M. leucopheata Conrad	----	.....	.....	.....	Maryland
	Suborder ARCACEA.					
	Family ARCIDÆ.					
	Genus ARCA Linné.					
	Section ARCA Lamarck.					
95	A. nose Linné	----	.....	.....	1/10	Hatteras
96	A. imbricata Bruguière	----	.....	.....	.....	Hatteras
	Section BARBATIA Gray.					
97	A. candida Chemnitz	----	.....	.....	2/3	Hatteras
98	A. ———	----	.....	.....	.....	St. Augustine
99	*A. ectocomata* Dall	6	9, 10	26.0	33/165	.....
100	A. barbata Linné	----	.....	.....	7/10	N. Carolina
	Section NOETIA Gray.					
101	A. ponderosa Say	----	.....	.....	.....	Cape Cod
102	A. Orbignyi Kobelt	----	.....	.....	.....	Texas
103	A. Jamaicensis Gmelin	----	.....	.....	.....	N. Carolina
	Section SCAPHARCA Gray.					
104	A. lienosa Say	----	.....	.....	.....	Hatteras
105	A. transversa Say	56	2	.....	1/10	Cape Cod
	A. incongrua Say	----	.....	.....	.....	Hatteras
	A. auriculata Lamarck	----	.....	.....	11/10	Key West
	Section ARGINA Gray.					
108	A. pexata Say	56	16	.....	9/10	Cape Cod
109	A. Holmesii Kurtz	----	.....	.....	.....	.....
110	A. Americana Gray	----	.....	.....	.....	Hatteras

TABLE II. B.—*List of Pelecypoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla, Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
*	..	*	..	....	....	....	....	....	....	*	*	Hatteras	P. Pliocene.
*	..	*	..	....	....	....	....	....	....	*	*	Hatteras	P. Pliocene.
....	..	*	..	....	*	*	....	*	*	*	....	N. Grenada..	
*	..	*	..	....	....	....	....	....	....	....	....	Hatteras	P. Pliocene.
....	..	†*	..	....	....	....	....	....	....	*	*	Hatteras	
....	..	*	..	....	*	*	....	*†	....	....	....	Barbados ...	
....	†	....	..	....	....	....	....	....	....	....	....	.....	
*	*	*	..	*	....	*	....	*	....	....	....	Aspinwall...	
....	..	*	..	....	*	*	....	*	*	*	*	Carthagena .	
....	..	*	*	*	*	*	*	*	*	....	....	Aspinwall...	
....	..	*	..	....	*	*	....	*	....	....	....	Trinidad	
....	..	....	*	....	....	*	....	*	....	....	....	St. Thomas..	
....	..	....	..	....	....	....	....	†	....	....	....	Barbados....	
....	..	*	..	....	*	*	*	*†	....	....	....	Barbados....	
*	*	*	*	*	*	*	*	*	....	....	....	St. Thomas ?.	P. Pliocene.
*	*	*	*	*	*	*	*	*	....	....	....	St. Thomas ..	
....	..	*	*	....	....	*	....	*	*	....	....	Venezuela...	Pliocene.
....	..	*	*	*	*	*	*	*	....	....	....	Trinidad	Pliocene.
*	*	*	*	*	*	....	....	....	....	....	....	Key West ...	Miocene
....	..	*	*	*	*	*	*	....	....	....	....	Aspinwall...	Pliocene
....	..	....	..	....	*	....	*	*	....	....	....	Martiniqne..	
*	*	*	*	....	....	?	*	....	....	....	....	.....	Pliocene.
....	*	*	..	....	....	....	....	....	....	....	....	Charleston ..	
....	..	*	*	*	*	....	*	*	....	....	....	Trinidad	Pliocene.

TABLE II. B.—*List of Pelecypoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon	Range in depth.	Northern extreme range.
	Section BYSSOARCA Swainson.					
111	A. reticulata Gmelin	....	.....	.....	0/287	Hatteras ....
112	A. Adamsi Shuttleworth	....	.....	.....	10/38	Hatteras ....
113	var. Conradiana Dall	....	.....	.....	35/82	Hatteras ....
114	A. nodulosa Müller	....	.....	.....	15/125	Norway .....
115	A. pectunculoides Scacchi	8	5	8.0	75/1638	Norway .....
116	*A. polycyma* Dall	8	3, 3*a*	9.75	.....	.....
117	A. glomerula Dall	8	9, 9*a*	5.75	100/683	Hatteras ....
	Subgenus **Macrodon** Lycett.					
118	M. asperula Dall	8	4, 4*a*	8.5	310/1668	Fernandina..
119	M. sagrinata Dall	....	.....	6.0	80	Florida Str..
120	M. profundicola Verrill	46	23, 23*a*	12.0	2021	N. Lat. 37° ..
121	M. ———	....	.....	.....	92	Florida Str..
	Genus PECTUNCULUS Lam.					
122	P. undatus Linné	....	.....	.....	10/63	Hatteras ....
123	P. pectinatus Gmelin	....	.....	.....	9/175	Hatteras ....
	Genus LIMOPSIS Sassi.					
124	L. minuta Philippi	....	.....	.....	30/1211	Norway .....
125	L. tenella Jeffreys	....	.....	10.5	187/2033	N. Atlantic ..
126	L. antillensis Dall	8	7, 7*a*	3.5	80/683	Hatteras ....
127	L. cristata Jeffreys	....	.....	.....	86/1685	Norway .....
128	L. aurita Brocchi	....	.....	22.0	9/1817	Norway .....
129	var. *paucidentata* Dall	....	.....	9.0	874	.....
130	var. plana Verrill	....	.....	14.0	1111/1211	Chesapeake..
	Suborder NUCULACEA.					
	Family NUCULIDÆ.					
	Genus PLEURODON S. Wood.					
131	P. Adamsii Dall	....	.....	2.87	205	Florida Str..
	Genus NUCULA Lamarck.					
132	N. ægeënsis Jeffreys	....	.....	10.7	8/461	Mediter. Sea.
133	N. cymella Dall	....	.....	5.1	305/1100	Florida Str..
134	N. tenuis Montagu	68	8	.....	75/1685	Arctic Ocean
135	N. proxima Say	56	4	.....	9/100	Nova Scotia.
136	*N. delphinodonta* Mighels	56	8	.....	.....	Greenland...
137	*N. cancellata* Jeffreys	....	.....	.....	888/2033	N. Atlantic ..
138	N. granulosa Verrill	....	.....	.....	63/685	George's B'k.
139	N. crenulata A. Adams	7	2	7.3	30/462	Hatteras ....
140	var. obliterata Dall	8	2	7.3	424/1091	Hatteras ....
141	N. Verrilli Dall	....	.....	4.5	430/1685	Rhode Island

TABLE II. B.—*List of Pelecypoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	†*	..	*	*	*	*	*	*	....	....	Barbados....	
....	.	*	..	....	*	*	....	*	*	....	....	St. Lucia	
....	..	*	..	....	....	†	....	....	....	....	....	Cedar Keys..	
....	..	....	..	....	†*	....	....	....	....	*	...	Sand Key....	
†	..	†	†	....	....	†	....	†	....	†	....	St. Vincent..	P. Pliocene.
....	..	....		....	....	....	....	†	....	....	....	Grenada.....	
....	..	†	..	....	†	†	....	†	....	....	....	St. Vincent..	
....	..	....	†	....	†	†	†	†	....	....	....	Yucatan	
....	..	...	..	....	†	....	....	†	....	....	....	Cuba.....	
†	..	....	..	....	....	....	....	....	....	....	....	.....	
....	..	....	..	....	†	....	....	†	....	....	....	Cuba.....	
....	..	*	*	*	*	....	....	*	....	....	....	St. Lucia....	Miocene.
....	..	*	*	....	*	*	*	*†	....	....	....	Barbados....	Pliocene.
†	..	....	.	....	†	*	....	†	....	†	....	Barbados....	Miocene.
†	..	....	..	....	†	†	....	†	....	†	....	Cuba.....	
....	..	†	..	....	†	....	....	†	....	....	....	Florida Str..	
†	..	†	†	....	†	....	†	†	....	†	....	Yucatan.....	
†	†	†	†	....	†	†	....	†	†	†	....	Grenada	Miocene.
....	..	....	..	....	....	....	....	†	....	....	....	Jamaica.....	
†	†	....	..	....	....	....	....	†	....	....	....	Dominica ...	
....	..	....	..	†	....	....	....	†	....	....	....	Bahamas....	
....	..	†*	†	....	†	*	....	†	....	†	....	Trinidad	
....	..	....	..	†	†	....	†	†	....	....	....	Yucatan.....	
*	*	*	..	....	....	....	....	....	....	†*	*	Hatteras	
*†	*	†*	..	....	....	*	....	....	....	....	....	Charlotte H.	Miocene.
*	..	....	..	....	....	....	....	....	....	?	....	New Jersey..	P. Pliocene.
†	..	....	..	....	....	....	....	....	....	†	....	.....	
....	†	....	..	....	....	....	....	....	....	....	....	C. Lookout ..	
....	..	†	..	....	....	*†	....	†	....	....	....	Barbados....	
....	..	†	..	....	....	....	....	†	....	....	....	St. Vincent..	
†	†	†	..	....	....	†	....	†	....	....	....	Yucatan.....	

TABLE II. B.—*List of Pelecypoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Family LEDIDÆ.					
	Genus LEDA Schumacher.					
	Subgenus Yoldia Mörch.					
142	Y. solenoides Dall	9	2, 2*a*	12.5	118	Miss. delta
143	Y. liorhina Dall	9	1, 1*a*	13.1	100/1065	Gulf of Mex.
144	Y. limatula Say	49 56	5 1	....	8/50	Norway
145	Y. sapotilla Gould	56	9	.....	9/124	Arctic Sea
146	Y. sericea Jeffreys	....	.....	.....	1300/1731	N. Atlantic
147	Y. hebes Smith	....	.....	4.0	194/815	Cedar Keys
148	Y. insculpta Jeffreys	....	.....	.....	193/850	N. Atlantic
149	Y. Jeffreysi Hidalgo	....	.....	.....	349/1285	N. Atlantic
150	Y. subequilatera Jeffreys	....	.....	.....	92/731	Norway
151	Y. pompholyx Dall	....	.....	4.0	30A/1024	Fernandina
	Subgenus Leda Schumacher.					
152	L. Carpenteri Dall	8 9	11 3	10.5	14/267	Hatteras
153	L. messanensis Seguenza	....	.....	4.0	33/1033	N. Atlantic
154	L. solidula Smith	....	.....	.....	640/1001	Hatteras
155	L. vitrea Orbigny	8	12,12*a*	6.5	100/250	Florida Str.
156	L. acuta Conrad	7 45 64	3, 8 15 140	9.5 13.0	7/212	Rhode Island
157	L. Bushiana Verrill	....	.....	15.0	130/816	Hatteras
158	L. concentrica Say	....	.....	.....	.....	Texas
159	L. Verrilliana Dall	....	.....	13.0	.....	Hatteras
160	L. ———	....	.....	4.1	337/1024	Cedar Keys
161	L. ———	....	.....	4.0	494/850	Florida Str.
162	L. quadraungularis Dall	8	6	4.6	833/1065	Hatteras
163	L. pusio Philippi	....	.....	.....	808/1091	N. Atlantic
164	L. solidifacta Dall	7	7*a–b*	12.5	287	Florida Str.
165	L. ———	....	.....	.....	194/212	Cedar Keys
	Section NEILONELLA Dall.					
166	L. corpulenta Dall	7	1*a–b*	9.5	130/450	Florida Str.
	Genus MALLETIA Desm.					
	Section TINDARIA Bellardi.					
	M. cytherea Dall	8	1, 1*a*	8.6	300/724	Florida Str.
	M. amabilis Dall	40	8	15.0	148/940	Cedar Keys

TABLE II. B.—*List of Pelecypoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
---	--	----	--	----	----	†	†	----	----	----	----	Yucatan.....	
----	--	----	--	----	†	†	----	†	----	----	----	Barbados....	
*	*	*	--	----	----	----	----	----	----	*	*	N. Carolina..	Pliocene.
*†	.	†	--	----	----	----	----	----	----	*	*	Hatteras	
†	†	†	--	†	----	----	----	†	----	†	----	Florida Str..	
----	--	----	--	----	----	†	----	†	----	----	----	Culebra Id ..	
----	--	----	--	†	†	----	----	†	----	†	----	Florida Str ..	
----	--	†	--	----	†	----	----	†	†	†	----	Florida Str ..	
----	--	†	--	----	----	†	----	----	----	†	----	Grenada	
----	--	----	†	†	†	----	----	†	----	----	----	Cuba	
----	--	†	--	†	†*	----	----	†	----	----	----	Barbados....	
†	†	†*	†	†	†	----	----	†	†	*	----	Barbados....	Pliocene.
----	--	†	--	----	†	†	†	†	----	----	----	Brazil.....	
----	--	----	--	----	†	----	----	†	----	----	----	Barbados....	
----	--	†*	*	----	†	*†	----	†	----	----	----	Sombrero ...	Miocene.
----	--	†	--	†	----	----	----	----	----	----	----	Florida Str ..	
----	--	----	--	----	----	*	*	*	----	----	----	Trinidad	Pliocene.
----	--	†*	--	----	----	----	----	----	----	----	----	Cape Fear...	
----	--	----	--	----	†	†	----	†	----	----	----	Cuba.....	
----	--	----	--	†	†	----	----	†	----	----	----	Cuba.....	
----	--	†	--	----	†	----	----	†	----	----	----	Cuba.....	
----	--	----	--	----	†	----	†	†	----	†	----	Bequia.....	Pliocene.
----	--	----	--	----	†	----	----	†	----	----	----	Cuba.....	
----	--	----	--	†	----	†	----	†	----	----	----	Florida Str ..	
----	--	----	--	----	†	----	----	†	----	----	----	Jamaica	
----	--	----	--	†	----	†	----	†	----	----	----	St. Vincent..	
----	--	----	--	----	----	†	----	†	----	----	----	Tobago	

TABLE II. B.—*List of Pelecypoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Section NEILO A. Ad.					
169	M. dilatata Philippi	....	.....	.....	333 / 333	N. Atlantic..
170	M. ———	....	.....	.....	1181	Cedar Keys..
171	M. obtusa Sars	....	.....	.....	516 / 1668	Norway .....
	Genus GLOMUS Jeffreys.					
172	G. nitens Jeffreys	....	.....	.....	334 / 1700	Norway .....
	Suborder SOLENOMYACEA.					
	Family SOLENOMYIDÆ.					
	Genus SOLENOMYA Lamarck.					
173	S. velum Say	58	3	20.0	0 / 384	Nova Scotia.
174	S. ———	....	.....	12.0	33 / 300	C. Lookout..
175	S. occidentalis Deshayes	....	.....	7.0	0 / 8	Gulf of Mex .
	Order TELEODESMACEA.					
	Suborder CARDITACEA.					
	Family CARDITIDÆ.					
	Genus CARDITA Bruguière.					
176	C. domingensis Orbigny	....	.....	.....	36 / 124	Hatteras ....
177	C. Conradii Shuttleworth ?	....	.....	.....	.....	Tampa .....
178	C. floridana Conrad	....	.....	.....	.....	Tampa .....
179	C. gracilis Shuttleworth	....	.....	.....	.....	Tampa .....
	Subgenus **Venericardia** Lamarck.					
180	V. borealis Conrad	58	9	.....	5 / 100	Arctic Sea...
181	var. granulata Say	....	.....	.....	50 / 100	Rhode Island
182	var. *nov-angliæ* Morse	58	10	.....	3 / 40	Nova Scotia.
183	V. tridentata Say	....	.....	.....	36 / 124	Hatteras ....
184	V. fiabella Conrad	....	.....	.....	14 / 84	Hatteras ....
	Family ASTARTIDÆ.					
	Genus ASTARTE J. Sowerby.					
185	A. undata Gould	58	1	.....	5 / 100	Nova Scotia.
186	A. castanea Say	58	7	.....	5 / 65	Nova Scotia.
187	A. lens Stimpson	....	.....	.....	22 / 124	Rhode Island
188	A. Smithii Dall	7	5*a–b*	7.0	14 / 1088	Gulf of Mex .
189	A. globula Dall	....	.....	5.0	284 / 402	Fernandina .
190	A. nana Jeffreys	7	6*a–b*	8.2	32 / 196	Hatteras ....
	Subgenus **Goodallia** Turton.					
191	G. ———	....	.....	.....	18 / 18	Cape Lookout

TABLE II. B.—*List of Pelecypoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	....	..	....	†	....	....	†	....	†	....	Old Provid'ce	Pliocene.
....	..	....	..	....	....	†	....	....	....	....	....	.....	
†	†	†	..	....	....	....	....	....	....	†	....	Hatteras	
....	..	....	†	†	....	....	....	†	....	....	....	Cuba.....	
*	*	*	..	....	....	....	....	....	....	....	....	N. Carolina..	P. Pliocene.
....	..	*	..	....	....	....	†	†	....	....	....	Cuba.....	
....	..	....	..	....	*	*	....	*	....	....	?	Guadalupe ..	
....	..	†*	..	....	†	....	....	*†	....	....	....	Sombrero ...	
....	..	....	..	....	*	*	....	....	....	....	....	Key West ...	Miocene.
....	..	....	..	....	*	*	....	....	....	....	....	Key West ...	
....	..	....	..	....	....	*	....	....	....	....	....	.....	
†	†	†	..	....	....	....	....	....	....	†	†	Hatteras	Miocene.
....	..	†*	..	....	....	....	....	....	....	....	....	Hatteras	Miocene.
....	..	....	..	....	....	....	....	....	....	....	*	Rhode Island	
....	..	†*	..	....	....	*	....	....	....	....	....	Charlotte H .	Miocene.
....	..	*	†	....	....	*	....	....	....	....	....	Charlotte H .	Miocene.
....	..	*	..	....	....	....	....	....	....	....	....	Hatteras	P. Pliocene.
*	..	†	..	....	....	....	....	....	....	....	....	Hatteras	P. Pliocene.
....	..	†*	†	....	†	....	....	....	....	....	....	Cape Florida	
....	..	....	..	....	†	†	....	†	....	....	....	Barbados....	
....	..	....	†	...	†	....	....	†	....	....	....	Cuba.....	
....	..	†*	..	....	*	*	....	*	....	....	....	Sombrero ...	
....	..	†*	..	....	....	....	....	....	....	....	....	Cape Fear...	

TABLE II. B.—*List of Pelecypoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
234	L. sagrinata Dall			7.6	$\frac{88}{300}$	Gulf of Mex.
235	L. multilineata Conrad			15.0	$\frac{8}{287}$	C. Lookout
236	L. lintea Conrad				$\frac{9}{300}$	Hatteras
237	L. scabra Lamarck				$\frac{10}{182}$	Florida Str.
	Genus LORIPES Poli.					
238	L. edentula Linné				$\frac{8}{300}$	Hatteras
239	var. chrysostoma Mörch					Tampa
240	L. lens Verrill and Smith				$\frac{8}{287}$	Cape Cod
241	L. compressa Dall	14	2	10.0	$\frac{12}{274}$	Gulf of Mex.
	Family DIPLODONTIDÆ.					
	Genus DIPLODONTA Turton.					
242	D. turgida V. & S	45 64 65	10, 11 136 135	25.0	$\frac{18}{179}$	Rhode Island
243	D. subglobosa C. B. Adams				$\frac{3}{124}$	Hatteras
244	D. soror C. B. Adams					Tortugas
245	D. semiaspera Philippi				$\frac{14}{294}$	Hatteras
	Suborder CHAMACEA.					
	Family CHAMIDÆ.					
	Genus CHAMA Bruguière.					
246	C. arcinella Linné				$\frac{9}{288}$	Hatteras
247	C. sarda Reeve				$\frac{9}{85}$	Cape Florida
248	C. congregata Conrad				$\frac{9}{82}$	Hatteras
249	C. macrophylla Chemnitz				$\frac{9}{287}$	Tampa
250	C. lactuca Dall			25.0	$\frac{63}{100}$	Hatteras
	Suborder CARDIACEA.					
	Family CARDIIDÆ.					
	Genus CARDIUM Linné.					
251	C. magnum Born					Virginia
252	C. isocardia Linné					Hatteras
253	C. muricatum Linné					N. Carolina
254	C. antillarum Orbigny	4	6	8.2	$\frac{3}{182}$	Florida Str.
255	C. pinnulatum Conrad	58	5		$\frac{1}{286}$	Labrador
256	C. islandicum Linné				$\frac{5}{50}$	Arctic Sea
257	C. peramabilis Dall	4 40	7 4	12.5	$\frac{18}{164}$	Rhode Island
258	var. tinctum Dall				$\frac{75}{100}$	Key West
259	C. medium Linné					C. Lookout

TABLE II. B.—*List of Pelecypoda*—Continued.

N. J.	Va.	Hat.	Ga	East Fla.	Fla. Keys.	West Fla.	Tex	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	....	..	....	....	*	....	....	....	....	....	Charlotte ...	Pliocene.
....	..	*	*	....	....	....	....	....	....	....	....	St. Augustine	
....	..	†*	..	....	*	†*	....	†	*	....	....	Barbados....	Miocene.
....	..	†	..	....	....	....	....	....	....	....	....	.....	
....	..	....	..	....	*	*	....	*	....	....	....	Barbados....	
†*	..	*†	..	*	*	*	....	*	*	....	....	Barbados....	Pliocene.
....	..	....	..	....	†	....	....	*†	....	....	....	Barbados....	Pliocene.
*	?	-	..	....	....	....	....	....	....	....	....	S. Carolina ..	
?	..	†	..	....	....	....	....	?	....	....	....	Hatteras	Pliocene.
....	..	*	..	....	....	....	....	....	....	....	....	S. Carolina ..	
....	..	*	..	....	....	....	....	....	....	....	....	.....	Pliocene.
....	..	*	..	....	....	....	....	....	....	....	....	.....	
....	..	*	..	....	....	....	....	....	....	....	....	.....	
....	..	†	..	....	....	....	....	....	....	....	....	.....	
....	..	?	..	....	....	*	....	....	....	....	....	Charlotte H.	Miocene.

TABLE II. B.—*List of Pelecypoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Suborder LUCINACEA.					
	Family UNGULINIDÆ.					
	Genus TELLIMYA Brown.					
207	*T. ferruginosa* Montagu	45	13	8.5	354/457	Norway
208	T. tumidula Jeffreys					Arctic Sea
209	T. elevata Stimsson	68	6		7/63	Maine
	Genus CRYPTODON Turton.					
210	C. obesus Verrill	58	12		13/1290	Arctic Sea
211	C. ovoideus Dall				353	S. Carolina
212	C. grandis Verrill and Smith	46	22	21.0	238/1344	Delaware
213	C. pyriformis Dall				55/731	Cape Fear
214	C. ferruginosus Forbes				100/1467	Arctic Sea
215	C. tortuosus Jeffreys				500/1290	N. Atlantic
216	*C. Gouldii* Philippi	58	2		6/300	Arctic Sea
	Family CYRENELLIDÆ.					
	Genus CYRENOIDEA Joannis.					
217	C. floridana Dall					Fernandina
	Family LUCINIDÆ.					
	Genus LUCINA Bruguière.					
	Subgenus Divaricella Von Martens.					
218	D. dentata Wood	58	6		6/61	George's B'k.
219	D. quadrisulcata Orbigny					Hatteras
	Subgenus Lucina s. s.					
220	L. pennsylvanica Linné					Hatteras
221	L. filosa Stimpson	58	14		18/300	Arctic Sea
222	L. jamaicensis Lamarck					St. Augustine
223	L. floridana Conrad					Cedar Keys
224	L. tigrina Linné					St. Augustine
225	L. pecten Lamarck					Tampa
226	L. lenticula Reeve				6/300	Turtle Harb.
227	L. pectinella C. B. Adams					Cape Florida
228	L. squamosa Lamarck				0/24	C. Lookout
229	L. costata Tuomey & Holmes				3/610	Hatteras
230	L. crenulata Conrad				18/124	Hatteras
231	L. trisulcata Conrad				0/18	Hatteras
232	L. leucocyma Dall			5.6	6/63	Hatteras
233	L. sombrerensis Dall			6.5	49/74	Gulf of Mex.

TABLE II. B.—*List of Pelecypoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
?	..	....	..	....	....	....	....	....	...	*	....	Rhode Id ? ..	
†	..	†	..	....	....	....	....	....	....	†	....	Hatteras	
?	..	†	..	....	....	....	....	....	....	....	....	Hatteras	
†	..	*†	†	†	†	....	....	....	....	....	....	Cape Florida	
....	..	†	..	....	....	....	....	....	....	....	....	.....	
†	†	†	..	....	....	....	....	....	....	....	....	Hatteras	
....	..	†	..	....	†	....	....	†	....	....	....	Yucatan	
†	†	†	..	....	....	....	....	....	....	†	†	Hatteras	
†	..	†	..	....	....	....	....	....	....	†	....	Hatteras	
*	..	....	..	....	....	....	....	....	....	....	....	Rhode Id....	P. Pliocene.
....	..	....	*	*	*	*	....	....	....	....	....	Florida Keys	Pliocene.
....	..	†*	..	....	....	....	....	†*	....	....	....	Brazil.....	
....	..	*	*	*	†	*	....	†*	....	...	....	Trinidad	
....	..	*	..	*	*	*	....	*	....	....	....	Guadalupe ..	Pliocene.
†	†	*†	..	....	†	....	....	†	....	....	....	Patagonia...	P. Pliocene.
....	..	....	*	....	....	*	*	*	....	....	....	Guadalupe ..	Pliocene.
....	..	....	..	....	*	*	....	....	....	....	....	Key West ...	
....	..	....	*	....	*	*	*	*	*	....	....	Aspinwall...	Pliocene.
....	..	....	..	....	*	*	....	*	*	....	....	Curaçoa.....	P. Pliocene.
....	..	....	-	....	†	....	....	†	....	....	....	Cuba	
....	..	....	..	....	†	....	....	*	....	....	....	Jamaica.....	
....	..	*	..	....	*	*	....	*	*	....	....	Guadalupe ..	
....	..	*	..	....	*	*	....	†	....	....	....	Yucatan.....	Pliocene.
....	..	†*	..	*	*	*	....	*	....	....	....	Cuba.....	Pliocene.
....	..	*	..	....	*	*	....	*	....	....	....	Cuba.....	Pliocene.
....	..	†	..	....	†	....	....	†	....	....	....	Sombrero ...	
....	..	....	..	....	†	†	....	†	....	....	....	Sombrero ...	

TABLE III. 3.—List of Trilobite species.

No.	Name and author of species	L	Tax	Loc.	Horiz.	Distribution
24	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
25	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
26	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Eastern [illegible]
27	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Genus [illegible]					
28	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Eastern [illegible]
29	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
30	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
31	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]					
	Genus [illegible]					
32	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Rhode Island
33	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Eastern [illegible]
34	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
35	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Eastern [illegible]
	[illegible]					
	[illegible]					
	Genus [illegible]					
36	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Eastern [illegible]
37	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
38	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Eastern [illegible]
39	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
40	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]					
	[illegible]					
	Genus [illegible]					
41	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
42	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
43	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
44	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
45	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
46	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Rhode Island
47	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Key West
48	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

TABLE II. B.—*List of Pelecypoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	....	..	....	†	†	....	†	....	....	....	Yucatan	
....	..	*	..	*†	*	*	....	†	....	....	....	Grenada	Pliocene.
....	..	*	..	†	*†	*	....	*	....	....	....	Cuba	Pliocene.
....	..	....	..	....	†	....	....	†	....	....	*	Guadalupe ..	
....	..	†	..	....	*	*	*	....	*	....	....	Martinique ..	Pliocene.
....	..	....	..	....	*	*	....	....	....	....	....	Santa Cruz ..	
....	..	....	..	....	†	....	....	†	....	....	....	Grenada	
....	..	....	..	....	....	....	†	†	....	....	....	Sombrero . ..	
†	..	†*	..	....	....	....	....	†	....	....	....	Grenada	
....	..	†*	..	....	*	*	....	*†	....	....	....	Trinidad	Pliocene.
....	..	....	..	....	*	....	....	*	....	....	....	Jamaica.....	
....	..	†*	†	†	*	....	....	†*	....	....	....	St. Thomas..	Pliocene.
....	..	*	..	....	*	*	*	*	....	....	....	Guadalupe ..	Pliocene.
....	..	....	..	....	*†	....	....	*†	....	....	....	Trinidad	
....	..	*	..	....	....	*	....	*	....	....	....	Yucatan	Miocene.
....	..	?	..	....	*	*	....	*†	*	....	....	Curaçoa.....	Pliocene.
....	..	†	..	....	.. ..	....	....	†	....	....	....	Barbados....	
....	*	*	*	*	*	*	*	*	....	....	....	Cuba	Pliocene.
....	..	*	..	....	*	*	....	*	*	....	....	Trinidad	
....	..	*	*	*	*	*	*	*	....	....	....	Trinidad	Pliocene.
....	..	....	..	....	*	....	....	†*	....	....	....	Guadalupe ..	Pliocene.
....	..	†*	..	....	....	....	....	....	....	....	....	C. Lookout..	P. Pliocene.
?	..	*†	..	....	....	....	....	....	....	....	....	Hatteras	
....	..	†	..	†	†	†	....	*†	....	....	....	Grenada	
....	..	....	..	....	†*	....	....	†*	....	....	....	Barbados....	
....	..	*	*	....	*	*	....	*†	....	....	....	Brazil	Pliocene.

TABLE II. B —*List of Pelecypoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Section EGETA, H. & A. Adams.					
303	C. floridana Conrad					Tampa
	Suborder TELLINACEA.					
	Family PETRICOLIDÆ.					
	Genus PETRICOLA Lamarck.					
304	P. pholadiformis Lamarck	59 64	15 140a			Pr. Edw. Isl.
305	var. dactylus Lamarck					Maine
306	P				Coral	Florida Keys.
	Subgenus Choristodon Jonas.					
307	C. robusta Sowerby					Cape Florida
308	C.? cancellata Verrill			8.0	70	Chesapeake
	Subgenus Naranaio Gray.					
309	N. lapicida Gmelin				0 6 6	Florida Keys.
	Genus CORALLIOPHAGA Blainv.					
310	C. carditoidea Blainville				0 3 5	Cedar Keys.
	Family DONACIDÆ.					
	Genus DONAX Linné.					
311	D. denticulatus Linné					Texas
312	D. variabilis Say					Hatteras
313	D. fossor Say			12.5		New Jersey
314	D. obesa Orbigny					St. Augustine
	Genus IPHIGENIA Schum.					
315	I. braziliana Lamarck					Indian River.
	Genus HETERODONAX Mörch.					
316	H. bimaculata Linné					Fernandina
	Family PSAMMOBIIDÆ.					
	Genus PSAMMOBIA Lamarck.					
317	P. vaginatus Reeve			30.0		Charlotte H.
	Genus TAGELUS Gray.					
318	T. gibbus Spengler	55 56	3 3	80.0 35.0		Cape Cod
319	T. divisus Spengler	56	5			Cape Cod
	Genus SOLETELLINA Blainv.					
320	S. rufescens Chemnitz					Gulf of Mex.

TABLE II. B.—*List of Pelecypoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	*	*	....	*	*†	....	*†	....	....	†	Brazil.....	
....	..	....	..	....	*	....	....	*†	....	....	....	Trinidad	
....	..	*	*	*	*	*	....	*	*	....	....	Guadalupe ..	
....	..	*	*	*	*†	*	....	*†	*	....	....	Guadalupe ..	
....	..	*	*	*	....	*	....	....	....	....	....	Charlotte H.	P. Pliocene.
....	..	*	..	....	....	....	....	....	....	*†	....	Hatteras	Pliocene.
....	..	....	..	....	....	....	....	†	....	....	....	Trinidad	
....	..	....	†	....	†	....	....	†	....	....	....	Bequia.....	
....	..	†	..	....	†	....	....	†	....	....	....	Cuba.....	
*	*	*	*	*	*	*	*	....	....	*	....	Yucatan	Miocene.
....	*	*	*	*	*	*	*	....	....	....	....	Florida Keys.	Miocene.
....	..	....	..	....	*	*	....	*	....	....	....	Porto Rico ..	
....	..	†	..	....	†	....	....	†*	....	....	....	Rio Janeiro..	
....	..	....	..	....	†	*	....	....	....	....	†	Florida Str..	Pliocene.
....	..	....	..	....	†	....	†	†	....	....	....	Barbados....	
....	..	†*	..	....	....	*	*	....	....	....	....	Honduras ...	Miocene.
....	..	*	..	*	*	*	....	*	*	....	....	Trinidad	
....	..	....	..	....	*	....	....	*	....	....	....	Aspinwall...	
....	..	†*	..	....	†	....	....	†	....	....	....	Barbados....	
....	..	....	..	....	†	....	....	*	....	....	....	Carthagena..	
....	..	*†	*	*	*	*	....	*	....	....	....	Guadalupe ..	
....	..	*†	..	*	....	*	*	*	....	....	....	Barbados....	Miocene.
....	..	....	..	*	*	*	*	*	....	....	....	Cuba.....	

TABLE II. B —*List of Pelecypoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Section EGETA, H. & A. Adams.					
303	C. floridana Conrad					Tampa
	Suborder TELLINACEA.					
	Family PETRICOLIDÆ.					
	Genus PETRICOLA Lamarck.					
304	P. pholadiformis Lamarck	59 64	15 140*a*			Pr. Edw. Isl.
305	var. dactylus Lamarck					Maine
306	P.				Coral	Florida Keys.
	Subgenus Choristodon Jonas.					
307	C. robusta Sowerby					Cape Florida
308	C.? cancellata Verrill			8.0	70	Chesapeake.
	Subgenus Naranaio Gray.					
309	N. lapicida Gmelin				0 6	Florida Keys.
	Genus CORALLIOPHAGA Blainv.					
310	C. carditoidea Blainville				0 10	Cedar Keys.
	Family DONACIDÆ.					
	Genus DONAX Linné.					
311	D. denticulatus Linné					Texas
312	D. variabilis Say					Hatteras
313	D. fossor Say			12.5		New Jersey.
314	D. obesa Orbigny					St. Augustine
	Genus IPHIGENIA Schum.					
315	I. braziliana Lamarck					Indian River.
	Genus HETERODONAX Mörch.					
316	H. bimaculata Linné					Fernandina.
	Family PSAMMOBIIDÆ.					
	Genus PSAMMOBIA Lamarck.					
317	P. vaginatus Reeve			30.0		Charlotte H.
	Genus TAGELUS Gray.					
318	T. gibbus Spengler	55 56	3 3	80.0 35.0		Cape Cod
319	T. divisus Spengler	56	5			Cape Cod
	Genus SOLETELLINA Blainv.					
320	S. rufescens Chemnitz					Gulf of Mex.

TABLE II. B.—*List of Pelecypoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
*	*	*	..	....	....	....	....	....	....	....	....	N. Carolina..	
*	*	*	..	....	....	....	....	....	....	....	....	N. Carolina..	
....	..	....	..	....	*	*	...	*	....	....	....	Martinique ..	Pliocene.
*	*	*†	..	....	....	*	....	....	....	....	....	Tampa	
....	..	....	..	....	*	....	....	*	...	....	....	N. Grenada ..	
....	..	*	..	....	....	*†	....	†	....	....	....	Grenada	
....	..	*†	..	....	†*	*	....	†*	*	....	....	Barbados....	
....	..	*	..	....	†	†	....	....	....	....	....	Gulf of Mex .	
....	..	....	..	....	....	....	*	....	....	....	....	Gulf of Mex .	
....	..	*	*	*	*	*	*	*	....	....	....	Guadalupe ..	
....	..	*	..	....	*	*	*	*	....	....	....	Cuba?	
....	..	*	..	....	*	*	...	....	....	....	....	Key West ...	
....	..	....	..	....	*	....	...	*	....	....	....	Santa Cruz..	
....	..	....	..	....	*	....	*	*	....	....	....	Aspinwall...	
....	..	?	..	....	*	....	....	*	....	....	....	Carthagena .	
..	..	....	..	....	†	....	....	†	....	....	....	Barbados....	
....	*	*	*	*	....	*	*	....	....	....	....	Vera Cruz...	
....	..	*	*	*	*	*	*	*	....	....	....	Aspinwall...	
....	..	*	..	....	*	*	....	*	....	....	....	Trinidad	
....	..	....	*	....	*	*	*	*	....	....	....	Cuba.....	

TABLE II. B.—*List of Pelecypoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Genus GEMMA Deshayes.					
283	G. purpurea H. C. Lea	56	11			Labrador
284	var. manhattanensis Prime					Cape Cod
	Genus CYTHEREA Lamarck.					
285	C. Simpsoni Dall					Tampa
286	C. convexa Say	56 64	15 142*a*	50.0	8/63	Pr. Edw. Isl.
287	C. albida Gmelin				0/20	Florida Str.
288	C. ? obovata Conrad				1/70	C. Lookout
289	C. hebræa Lamarck				0/85	Hatteras
290	C. ———				2/11	Hatteras
291	C. ? idonea Conrad					Texas
	Subgenus **Callista** Mörch.					
292	C. maculata Linné				0/28	Hatteras
293	C. gigantea Gmelin					Hatteras
	Subgenus **Transennella** Dall.					
294	T. Conradina Dall				0/31	Hatteras
295	T. cubaniana Orbigny				0/8	Cape Florida
	Subgenus **Dione** Gray.					
296	D. Dione Linné					Gulf of Mex.
	Subgenus **Tivela** Link.					
297	T. mactroides Born					Florida Keys?
	Subgenus **Veneriglossa** Dall.					
298	V. vesica Dall			22.0	84/175	Florida Str.
	Genus DOSINIA Scopoli.					
299	D. discus Reeve					Virginia
300	D. elegans Conrad					Hatteras
	Genus LUCINOPSIS F. & H.					
301	L. tenuis Recluz				0/8	Hatteras
	Family CORBICULIDÆ.					
	Genus CYRENA Lamarck.					
	Section LEPTOSIPHON, Fischer.					
302	C. carolinensis Bosc					C

TABLE II. B.—*List of Pelecypoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
*	*	*	..	....	....	....	....	....	....	....	....	N. Carolina..	
*	*	*	..	....	....	....	....	....	....	....	....	N. Carolina..	
....	..	....	..	....	*	*	....	*	....	....	....	Martinique..	Pliocene.
*	*	*†	..	....	....	*	....	....	....	....	....	Tampa.....	
....	..	....	..	....	*	....	....	*	....	....	....	N. Grenada..	
....	..	*	..	....	....	*†	....	†	....	....	....	Grenada	
....	..	*†	..	....	†*	*	....	†*	*	....	....	Barbados....	
....	..	*	..	....	†	†	....	....	....	....	....	Gulf of Mex.	
....	..	....	..	....	....	....	*	....	....	....	....	Gulf of Mex.	
....	..	*	*	*	*	*	*	*	....	....	....	Guadalupe ..	
....	..	*	..	....	*	*	*	*	....	....	....	Cuba?	
....	..	*	..	....	*	*	....	....	....	....	....	Key West ...	
....	..	....	..	....	*	....	....	*	....	....	....	Santa Cruz..	
....	..	....	..	....	*	....	*	*	....	....	....	Aspinwall...	
....	..	?	..	....	*	....	....	*	....	....	....	Carthagena .	
..	..	....	..	....	†	....	....	†	....	....	....	Barbados....	
....	*	*	*	*	....	*	*	....	....	....	....	Vera Cruz...	
....	..	*	*	*	*	*	*	*	....	....	....	Aspinwall...	
....	..	*	..	....	*	*	....	*	....	....	....	Trinidad	
....	..	....	*	....	*	*	*	*	....	....	....	Cuba.....	

TABLE II. B —*List of Pelecypoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Section EGETA, H. & A. Adams.					
303	C. floridana Conrad					Tampa
	Suborder TELLINACEA.					
	Family PETRICOLIDÆ.					
	Genus PETRICOLA Lamarck.					
304	P. pholadiformis Lamarck	59 64	15 140*a*			Pr. Edw. Isl.
305	var. dactylus Lamarck					Maine
306	P				Coral	Florida Keys.
	Subgenus **Choristodon** Jonas.					
307	C. robusta Sowerby					Cape Florida
308	C.? cancellata Verrill			8.0	70	Chesapeake.
	Subgenus **Naranaio** Gray.					
309	N. lapicida Gmelin				$\frac{0}{6}$	Florida Keys.
	Genus CORALLIOPHAGA Blainv.					
310	C. carditoidea Blainville				$\frac{0}{30}$	Cedar Keys.
	Family DONACIDÆ.					
	Genus DONAX Linné.					
311	D. denticulatus Linné					Texas
312	D. variabilis Say					Hatteras
313	D. fossor Say			12.5		New Jersey.
314	D. obesa Orbigny					St. Augustine
	Genus IPHIGENIA Schum.					
315	I. braziliana Lamarck					Indian River.
	Genus HETERODONAX Mörch.					
316	H. bimaculata Linné					Fernandina.
	Family PSAMMOBIIDÆ.					
	Genus PSAMMOBIA Lamarck.					
317	P. vaginatus Reeve			30.0		Charlotte H.
	Genus TAGELUS Gray.					
318	T. gibbus Spengler	55 56	3 3	80.0 35.0		Cape Cod
319	T. divisus Spengler	56	5			Cape Cod
	Genus SOLETELLINA Blainv.					
320	S. rufescens Chemnitz					Gulf of Mex.

TABLE II. B.—*List of Pelecypoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	....	..	....	....	*	....	....	....	....	....	.....	
*	*	*	*	*	*	....	*	*	....	....	....	St. Thomas..	Pliocene.
*	..	*	..	....	....	....	....	....	....	....	....	S. Carolina..	Pliocene.
....	..	....	.	....	*	....	....	....	....	....	....	.....	
....	..	*	..	....	*	*	....	*	....	....	....	Guadalupe ..	
*	*	....	..	....	....	....	....	....	....	....	....	.....	
....	..	....	..	....	* †	....	....	*	....	....	....	Martinique..	
....	..	....	..	....	....	*	*	*	*	....	....	St. Thomas..	
....	..	....	..	....	*	*	*	*	....	....	....	Rio Janeiro .	
....	.	*	*	*	*	*	*	*	....	....	....	St. Thomas..	
*	*	*	*	*	*	*	*	....	....	....	....	Florida Keys.	
....	..	....	*	....	....	....	*	....	...	....	....	Texas	
....	..	....	..	*	*	*	*	*	....	....	....	Brazil	
....	..	....	*	*	*	*	....	*	*	....	*	Trinidad	
.....	..	....	..	....	....	? *	....	....	....	....	....	.....	
*	*	*	*	*	....	*	*	*	....	*	?	Trinidad	Miocene.
*	*	*	*	....	*	*	....	*	....	....	....	Guadalupe ..	Pliocene.
....	..	....	..	....	....	....	*	*	....	....	*	Aspinwall...	

TABLE II. B.—*List of Pelecypoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Genus TELLIDORA Mörch.					
356	T. cristata Recluz	....	.....	.....	.....	N. Carolina .
	Genus STRIGILLA Turton.					
357	S. carnaria Linné	....	.....	.....	.....	Hatteras ....
358	S. pisiformis Linné	....	.....	.....	.....	Key West ...
359	S. flexuosa Say	....	.....	.....	0/30	Hatteras ....
	Genus LUTRICOLA Blainville.					
360	L. interstriata Say	....	.....	.....	.....	Florida Keys
	Genus GASTRANELLA Verrill.					
361	G. tumida Verrill	59	8	4.0	4/11	Connecticut .
	Family SEMELIDÆ.					
	Genus ABRA (Leach) Risso.					
362	A. longicallus Scacchi	....	.....	.....	10/1467	Arctic Sea...
363	A. æqualis Say	....	.....	.....	.....	Connecticut?
364	A. lioica Dall	4	8	8.1	14/560	Rhode Island
	Genus CUMINGIA Sowerby.					
365	C. tellinoides Conrad	56	14	18.0	0/30	Cape Cod ...
	Genus ERVILIA Turton.					
366	E. nitens Montagu	....	.....	.....	.....	Tortugas ....
367	E. concentrica Gould	....	.....	....	0/17	Hatteras ....
	Genus SEMELE Schumacher.					
368	S. reticulata Gmelin	....	.....	.....	.....	Virginia ....
369	S. obliqua Wood	....	.....	.....	.....	Cape Fear...
370	S. cancellata Orbigny	....	.....	.....	.....	Hatteras ....
71	S. nuculoides Conrad	....	.....	.....	1/17	Hatteras ....
	Family GNATHODONTIDÆ.					
	Genus GNATHODON Gray.					
372	G. cuneata Conrad	....	.....	.....	.....	Gulf of Mex.
373	G. rostrata Petit	....	.....	.....	.....	Gulf of Mex.
	Suborder MACTRACEA.					
	Family MACTRIDÆ.					
374	M. solidissima Dillwyn	57	2	150.0	.....	Labrador....
375	var. similis Say	....	.....	.....	.....	Hatteras ....
376	M. brasiliana Lamarck	....	.....	.....	.....	Hatteras ....
377	M. lateralis Say	69	8	.....	.....	N. Brunswick

TABLE II. B.—*List of Pelecypoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	*	..	....	*	*	....	*	....	....	....	Trinidad	Pliocene.
....	..	*	..	....	*	....	....	*	....	....	?	Trinidad	Pliocene.
....	..	....	..	....	*	....	....	*	....	....	....	Guadalupe ..	
....	..	*	*	....	*	*	....	*	....	....	....	Haiti	P. Pliocene.
....	..	....	..	....	*	*	....	*	*	....	....	Guadalupe ..	
....	..	*	..	....	....	....	....	....	...	....	?	C. Lookout..	
†	†	....	..	....	†	†	....	†	....	†	....	Grenada	Pliocene.
....	..	*	*	*	....	*	*	....	....	....	....	Gulf of Mex.	Miocene.
....	..	†*	..	....	†*	*	....	*†	....	....	....	Martinique..	
*	*	*	..	....	*	*	....	*	....	....	....	Guadalupe ..	Miocene.
....	..	....	..	...	*	....	....	*	....	....	....	Guadalupe ..	Pliocene.
....	..	†*	*	....	*	*	....	....	*	....	....	Key West ...	
....	*	*	..	....	*	*	*	*	*	....	....	Guadalupe ..	
....	..	*	..	....	*	*	....	*	....	....	....	Trinidad	
....	..	*†	..	....	*	*	....	*	*	....	....	Martinique ..	Pliocene.
....	..	*†	..	....	....	*	....	....	....	....	....	Tampa	Miocene.
....	..	....	..	....	....	*	*	....	....	....	....	W. Florida ..	Pliocen .
....	..	....	..	....	....	....	*	....	....	....	....	Texas	
*	..	*	..	....	....	....	....	....	....	....	....	Hatteras	Miocene.
....	..	*	*	*	*	*	*	?*	....	....	....	St. Thomas..	Pliocene.
....	..	*	*	*	*	*	*	*	....	....	....	Brazil	Pliocene.
*	*	*	*	*	*	*	*	....	....	....	....	Florida Str..	Miocene.

TABLE II. B.—*List of Pelecypoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Genus LABIOSA Schmidt.					
378	L. lineata Say					New Jersey.
379	L. canaliculata Say					New Jersey.
	Order ANOMALODESMACEA.					
	Suborder ANATINACEA.					
	Family ANATINIDÆ.					
	Genus THRACIA Blainv.					
380	T. Conradi Couthouy	69	9		1/15	Labrador.
381	T. Stimpsoni Dall			65.0	28	
382	T. corbuloides Blainville				11/30	Hatteras.
383	T. distorta Montagu					Gulf of Mex.
384	T. phaseolina Lamarck					Britain.
	Genus ASTHENOTHÆRUS Cpr.					
385	A. Hemphillii Dall			6.25	3/17	Gulf of Mex.
	Subgenus **Bushia** Dall.					
386	B. elegans Dall	39	1	12.5	44/75	Florida Str.
	Genus PERIPLOMA Schum.					
387	P. inæquivalvis Schumacher					Texas?
388	P. angulifera Philippi					Gulf of Mex.
389	P. tenera Jeffreys					Hatteras.
390	P. fragilis Totten	59	7		10/100	Labrador.
391	P. papyracea [Say] Conrad					Gulf of Mex.
	Subgenus **Cochlodesma** Couthouy.					
392	C. Leanum Conrad	59	6	32.5		Nova Scotia.
	Family LYONSIIDÆ.					
	Genus LYONSIA Turton.					
393	L. hyalina Conrad	59	11		9/30	Nova Scotia.
394	L. floridana Conrad				3/8	Gulf of Mex.
395	L. Beana Orbigny				9/30	Hatteras.
396	L. formosa Jeffreys			10.0	300/600	N. Atlantic.
397	L. ? arata Verrill	45 65	4, 5, 6 133–4		71/134	Rhode Island
	Genus LYONSIELLA M. Sars.					
398	*L. insculpta* Jeffreys	45	7, 8			Norway.
399	*L. abyssicola* Sars					Norway.

TABLE II. B.—*List of Pelecypoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
*	..	*	..	*	....	*	*	*	....	....	....	Cuba.....	
*	*	*	*	*	*	*	*	....	....	....	....	Gulf of Mex .	P. Pliocene.
*	..	*	..	....	....	....	....	....	....	....	....	Hatteras	P. Pliocene.
....	..	....	..	....	*	....	....	....	....	....	....	Tortugas	
....	..	*†	..	....	*	....	....	....	....	*	....	Key West ...	
....	..	....	..	....	....	*	*	*	....	*	....	Honduras ...	
....	..	....	..	....	*	....	†	†	....	*	....	Yucatan.....	
....	..	....	..	....	*	*	....	....	....	....	....	Marco, Fla ..	
....	..	....	..	....	†	....	....	†	....	....	....	Barbados....	
....	..	....	..	....	....	....	?	*	....	....	....	Trinidad	
....	..	....	..	....	*	*	*	....	....	....	....	Honduras ...	
....	..	†	..	†	†	....	....	....	....	†	....	Florida Keys	
*	..	....	..	....	....	....	....	†	....	....	....	.....	
....	..	....	..	....	....	*?	....	....	....	....	....	Santa Cruz..	
*	..	*	..	....	....	....	....	....	....	....	....	Hatteras	Pliocene.
*	..	*	..	....	....	*	*	....	....	....	....	Texas	Miocene.
...	..	....	..	....	....	*	*	*	....	....	....	Nicaragua...	
....	..	*	..	....	*	*	....	....	....	....	?	Guadalupe ..	
....	..	....	..	....	†	....	....	†	....	†	....	Campeche...	
?	..	....	..	....	....	....	....	....	....	....	....	.....	
†	..	....	..	....	....	....	....	....	....	*	....	Rhode Isl'd ?.	
†	..	....	..	....	....	....	....	....	..	*	....	Rhode Island	

TABLE II. B.—*List of Pelecypoda*—Continued.

No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Family VERTICORDIIDÆ.					
	Genus VERTICORDIA Wood.					
400	V. acuticostata Philippi	----	------	------	$\frac{71}{600}$	N. Atlantic ..
401	V. flexuosa Verrill	65	132	------	$\frac{78}{662}$	N. Atlantic ..
402	V. Woodii Smith	----	------	------	$\frac{100}{1000}$	Gulf of Mex.
403	V. granulifera Verrill	----	------	8.0	1423	Chesapeake .
404	V. Seguenzæ Dall	----	------	5.0	$\frac{124}{640}$	Hatteras ....
405	V. perversa Dall	39	4	5.0	731	Cape Fear...
	Subgenus **Trigonulina** Orbigny.					
406	T. ornata Orbigny	45 65	9, 9*a* 131	4.0	$\frac{8}{687}$	Rhode Island
	Section EUCIROA Dall.					
407	T. elegantissima Dall	2 39	1*a–b* 7	13.25 40.0	$\frac{223}{1756}$	C. Canaveral.
	Subgenus **Haliris** Dall.					
408	H. Fischeriana Dall	2	4*a–b*	10.0	$\frac{64}{229}$	N. Atlantic..
409	H. trapezoidea Seguenza	----	------	------	$\frac{65}{162}$	N. Atlantic..
	Family CUSPIDARIIDÆ.					
	Genus CUSPIDARIA Nardo.					
	Subgenus **Cuspidaria** s. s.					
410	C. glacialis Sars	----	------	------	$\frac{64}{1487}$	Norway .....
411	C. rostrata Spengler	----	------	------	$\frac{65}{1899}$	Arctic Sea...
412	C. microrhina Dall	40	2, 3	45.0	$\frac{504}{509}$	C. Canaveral.
413	C. Jeffreysi Dall	3	2	15.0	$\frac{133}{687}$	Florida Str..
414	C. obesa Loven	3	1	13.0	$\frac{30}{1230}$	Arctic Sea...
415	C. ? arcuata Dall	3	3, 4	12.5	640	Gulf of Mex .
416	C. lamellosa M. Sars	45	3	7.3	$\frac{50}{502}$	Norway .....
	Subgenus **Cardiomya** A. Adams.					
417	C. perrostrata Dall	2	3*a–b*	8.0	$\frac{84}{410}$	Tortugas ....
418	C. costellata Deshayes	----	------	------	$\frac{2}{205}$	Hatteras ....
419	var. corpulenta Dall	3	9	14.0	$\frac{223}{785}$	Florida Str..
420	C. ornatissima Orbigny	41	21	9.5	$\frac{2}{114}$	Hatteras ....
421	C. striata Jeffreys	3 65	10 129	19.0	$\frac{85}{1430}$	Arctic Sea...
	Subgenus **Liomya** A. Adams.					
	Section PLECTODON Cpr.					
422	L. granulata Dall	3	8	18.0	$\frac{84}{118}$	Cape Florida.
[illegible]	var. velvetina Dall	----	------	11.0	$\frac{84}{118}$	.....

TABLE II. B.—*List of Pelecypoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	....	..	†	†	†	....	†	....	†	†	Barbados....	Pliocene.
†	..	....	..	....	....	....	....	....	....	....	....	Rhode Isl'd..	
....	..	....	..	....	....	....	†	†	....	....	....	Brazil.....	
....	†	....	..	....	....	....	....	¶†	....	....	....	.....	
....	..	†	..	....	....	....	†	†	....	....	....	Yucatan.....	
....	..	†	..	....	....	....	....	....	....	....	....	.....	
....	..	†*	..	....	*	....	....	†	....	....	*	Barbados....	
....	..	....	†	†	†	....	....	†	....	....	....	Cuba	
....	..	†	..	....	†	†	....	†	....	†	....	Barbados....	
....	..	†	†	....	....	....	....	....	....	†	....	Fernandina .	Pliocene.
†	†	....	..	....	....	†	....	....	....	†*	....	Gulf of Mex .	
....	..	....	..	....	†	†	....	†	....	†	....	Barbados....	
....	..	....	..	†	....	....	....	....	....	....	....	.....	
....	..	....	..	....	†	†	....	†	....	....	....	St. Vincent..	
†	†	....	..	....	†	....	....	†	....	†*	....	Barbados....	
....	..	....	..	....	....	....	†	†	....	....	....	Yucatan	
†	..	....	..	....	....	....	....	....	....	†*	....	Rhode Id	Pliocene.
....	..	....	..	....	†	†	....	†	....	....	....	Grenada	
....	..	*†	..	†	†*	†	....	*	....	*	....	St. Thomas..	
....	..	....	..	....	†	....	....	†	....	....	....	St. Vincent..	
....	..	†*	..	....	....	....	....	*	....	....	....	Guadalupe ..	
....	..	†	..	†	†	....	....	....	†	†	....	Florida Str..	
....	..	....	..	....	†	....	....	†	....	....	....	Barbados....	
....	..	....	..	....	†	....	....	†	....	....	....	Barbados....	

TABLE [illegible] Species of Pyramidellidæ

Ser. No.	Name and authority for species	No.	Ver.	Ratio of diam.	Range in feet	Northern extreme range
	Section [illegible]					
424	L. halimera Dall			[illegible]	[illegible]	Cape Fear
	Subgenus [illegible]					
425	H. clavicularia Dall	[illegible]	[illegible]	[illegible]	[illegible]	N. Atlantic
	Genus MYONERA Dall and Simpson					
426	M. pentastriata Dall			[illegible]	[illegible]	Cape Cod
427	M. indiana Verrill			[illegible]	[illegible]	Chesapeake
428	M. semilitrata Dall	[illegible]	[illegible]	[illegible]	[illegible]	Lower Keys
429	M. immunita Dall	[illegible]	[illegible]	[illegible]	[illegible]	Florida Str.
	Family [illegible]					
	Genus POROMYA Forbes					
430	P. granulata Nyst					Norway
431	var. nucula Jeffreys					N. Atlantic
432	P. newtoni Segmenza					N. Atlantic
433	P. subovata Verrill	[illegible]	[illegible]			Chesapeake
	Section [illegible]					
434	P. elongata Dall	[illegible]	[illegible]	[illegible]	[illegible]	Gulf of Mex.
435	P. ornata Jeffreys					N. Atlantic
436	P. aduda Dall			[illegible]	[illegible]	Cape Fear
	Genus CETOCONCHA Dall					
437	C. brevis Dall	[illegible]	[illegible]	[illegible]	[illegible]	Chesapeake
438	C. margarita Dall	[illegible]	[illegible]	[illegible]	[illegible]	Florida Keys
	Family PANDORIDÆ					
	Genus PANDORA Hwass					
	Subgenus **Clidiophora** Cpr.					
439	C. trilineata Say	[illegible]	[illegible]	[illegible]	[illegible]	C. Hatteras
440	C. Gouldiana Dall	59	14	25.0	[illegible]	Nova Scotia
441	C. carolinensis Bush	[illegible]	[illegible]	14.2	[illegible]	Hatteras
	Subgenus **Kennerlia** Cpr.					
442	K. glacialis Leach	[illegible]	[illegible]	[illegible]	[illegible]	Arctic Sea
443	K. Bushiana Dall	[illegible]	[illegible]	11.5	[illegible]	Tampa

TABLE II. B.—*List of Pelecypoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	†	..	....	....	....	....	....	....	....	....	.....	
....	..	....	..	....	†	....	....	†	†	....	....	Barbados....	
....	..	†	..	....	†	....	....	†	....	....	....	Tobago	
....	†	....	..	....	†	....	....	†	....	....	....	St. Vincent..	
....	..	....	..	....	†	†	....	†	....	....	....	Jamaica.....	
....	..	....	..	....	†	....	....	†	....	....	....	Cuba.....	
....	..	†	..	....	†	....	....	†	....	†*	....	Barbados....	Miocene.
....	..	†	†	....	....	....	....	†	....	†	....	Barbados....	
....	..	....	..	†	....	....	....	†	....	....	....	Barbados....	
....	†	....	..	....	....	....	....	....	....	....	†	Patagonia ..	
....	..	....	..	....	†	....	....	†	....	....	....	Barbados....	
....	..	....	†	....	....	....	....	†	....	....	....	Grenada	
....	..	†	..	....	†	....	....	†	....	....	....	Cuba.....	
....	†	....	..	....	†	†	....	....	....	....	....	Gulf of Mex .	
....	..	....	..	....	†	....	....	†	....	....	....	Brazil.....	
....	..	*	..	....	....	*	*	....	....	....	....	Gulf of Mex .	
*	..	†*	..	....	....	....	....	....	....	....	....	N. Carolina†.	Pliocene.
....	..	*†	..	....	....	*	†	†	....	....	....	Yucatan	
....	..	†	..	....	†	....	....	....	....	*	*	Florida Str..	
....	..	....	..	....	....	*	....	....	....	....	....	Charlotte H .	

TABLE II. B.—*List of Pelecypoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Suborder MYACEA.					
	Family CORBULIDÆ.					
	Genus PARAMYA Conrad.					
444	P. subovata Conrad	....	.....	.....	$\frac{14}{31}$	Hatteras ....
	Genus BASTEROTIA Mayer.					
445	B. quadrata Hinds	1	2*a–b*	10.0	$\frac{6}{240}$	C. Lookout ..
	Genus CORBULA Bruguière.					
446	C. disparilis Orbigny	1	4*a–b*	.....	$\frac{6}{100}$	Hatteras ....
447	C. Krebsiana C. B. Adams	1	1*a–b*	6.1	$\frac{3}{8}$	Cape Florida.
448	C. contracta Say	1 59	6*a–b* 10	12.0	$\frac{3}{63}$	Cape Cod ...
449	C. Dietziana C. B. Adams	1	5*a–b*	10.7	$\frac{14}{100}$	Hatteras ....
450	C. Barrattiana C. B. Adams	2	7*a,b,c*	8.9	$\frac{2}{27}$	Hatteras ....
451	C. Cubaniana Orbigny	1	3*a,b,c*	12.7	$\frac{7}{100}$	Fla. Strait ..
452	C. Swiftiana C. B. Adams	2	5*a,b,c*	10.4	$\frac{7}{100}$	Hatteras ....
453	C. cymella Dall	1	7,7*a*	13.5	$\frac{48}{63}$	C. Florida...
454	C. nasuta Say	2	6*a, b, c, d*	8.5	$\frac{4}{63}$	Hatteras ....
	Family MYIDÆ.					
	Genus MYA Linné.					
455	M. arenaria Linné	49 55 69	9 2 2	75.0	$\frac{0}{40}$	Arctic Sea...
	Family SAXICAVIDÆ.					
	Genus SAXICAVA F. de B.					
456	S. arctica Linné	59	13	30.0	$\frac{0}{100}$	Arctic Sea...
457	S. azaria Dall	4	9*a–b*	25.0	.....	Charlotte H.
	Genus GLYCIMERIS Lamarck.					
458	G. reflexa Say	....	.....	.....	.....	Hatteras ....
	Suborder SOLENACEA.					
	Family SOLENIDÆ.					
	Genus SOLECURTUS Blainville.					
	Subgenus **Macha** Oken.					
459	M. sanctæ-marthæ Orbigny	....	.....	30.0	$\frac{15}{23}$	Hatteras ....
460	M. Cumingiana Dunker	....	.....	60.0	$\frac{14}{111}$	Hatteras ....
	Genus SILIQUA Megerle.					
461	S. costata Say	65 53	128*a* 3	.....	.....	Nova Scotia .

TABLE II. B.—*List of Pelecypoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	*	..	....	....	*	....	....	....	....	....	Tampa	Miocene.
....	..	*	..	....	*	....	*†	†	....	*	*	St. Thomas..	
....	..	*†	†	....	....	†	....	†	†	....	....	Barbados....	Pliocene.
....	..	....	..	....	†	....	....	*	....	....	....	Jamaica.....	
*	*	*†	..	....	....	*	....	*	....	....	....	Jamaica.....	Pliocene.
....	..	*†	..	....	†	....	....	†*	....	....	....	Barbados....	
....	..	*†	..	....	*	*	....	†*	....	....	....	Jamaica.....	
....	..	....	..	....	†	....	....	*†	....	....	....	Jamaica.....	
....	..	*	..	....	†*	....	....	†*	....	....	....	Venezuela...	
....	..	....	..	....	†	....	....	....	....	....	....	Gordon Key .	
....	..	*†	..	....	*	*	....	*	....	....	....	Haiti	
*	*	*	..	....	....	....	....	....	....	*	*	S. Carolina..	Pliocene.
*	*	*	*	*	*	*	....	†	....	*	*	Barbados.....	Miocene.
....	..	....	..	....	*	*	....	....	....	....	....	Gulf of Mex .	
....	..	*	..	....	....	*	....	....	....	....	....	Gulf of Mex .	Pliocene.
....	..	*	..	....	....	....	....	*	*	....	....	Rio Janeiro..	
....	..	*†	..	....	....	*†	*	....	....	....	....	Texas	
*	*	*	..	....	....	....	....	....	....	....	....	Hatteras	

TABLE II. B.—*List of Pelecypoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Genus SOLEN Linné.					
	Subgenus Ensis Schumacher.					
462	E. americana Gould	53 55	4 4, 5	.....	0 $\frac{0}{25}$	Labrador
463	E. viridis Say	....	.....	.....	.....	Rhode Island
	Suborder ENSIPHONACEA.					
	Family GASTROCHÆNIDÆ.					
	Genus GASTROCHÆNA Spengler.					
464	G. ovata Sowerby	....	.....	30.0	0 $\frac{0}{17}$	Charleston
465	G. cuneiformis Spengler	....	.....	25.0	0 $\frac{0}{25}$	Cape Fear
466	G. Stimpsonii Tryon	...	.....	16.0	.....	Beaufort
	Subgenus Spengleria Tryon.					
467	S. rostrata Spengler	....	.....	.....	.....	W. Florida
	Suborder ADESMACEA.					
	Family PHOLADIDÆ.					
	Genus PHOLAS Linné.					
468	P. Campechiensis Gmelin	....	.....	.....	.....	Hatteras
	Subgenus Barnea Leach.					
469	B. costata Linné	68	9	.....	.....	Cape Cod
470	B. maritima Orbigny	....	.....	.....	.....	Texas
471	B. truncata Say	59	12	.....	.....	Nahant
	Genus ZIRPHÆA Leach.					
472	Z. crispata Linné	68	10	.....	$\frac{0}{10}$	Arctic Sea
473	Z. semicostata Lea ?	....	.....	.....	$\frac{0}{16}$	Cape Fear
	Genus XYLOPHAGA Turton.					
474	X. abyssorum Dall	9	7, 7*a*	4.0	$\frac{330}{1000}$	N. Atlantic
475	X. dorsalis Turton	....	.....	.....	$\frac{33}{333}$	N. Atlantic
	Genus MARTESIA Leach.					
476	M. cuneiformis Say	....	.....	.....	$\frac{0}{12}$	Connecticut
477	M. striata Linné	....	.....	.....	.....	Britain
478	M. corticaria Adams	....	.....	.....	.....	Charlotte H.
	Section DIPLOTHYRA Tryon.					
479	M. Smithii Tryon	....	.....	.....	.....	Staten Island

TABLE II. B.—*List of Pelecypoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Ber-muda.	Eur.	West Am.	Southern extreme range.	Range in time.
*	*	*	*	*	*	*	....	....	....	....	....	Florida Keys	
*	*	*	*	....	....	*	..	....	....	....	....	Sarasota	
....	..	*	..	....	*	*	....	*	....	....	*	St. Thomas ..	
....	..	*	..	....	*	*	....	*	*	....	....	Guadalupe ..	
....	..	*	..	..	....	....	....	..	....	....	....	.....	
....	..	....	..	....	*	*	....	*	....	....	....	St. Thomas ..	
...		*	*	*	*	*	*	*	....	....	....	Cent. America	Pliocene.
*	*	*	*	*	*	*	*	*	....	*	....	S. America...	Pliocene.
....	..	....	..	....	....	*	*	*	....	....	....	.....	
*	*	*	..	....	*	*	....	....	....	....	*	.....	
*	..	*	..	....	....	....	....	....	....	*	*	S. Carolina ?.	Pliocene.
....	..	*	..	....	....	....	....	....	....	....	....	S. Carolina ..	
†	..	....	..	....	....	....	....	†	....	....	....	St. Lucia....	
†	..	....	..	....	....	....	....	....	....	†*	....	Delaware ?..	
?	*	*	*	*	*	*	*	*	....	....	....	Trinidad	
....	..	....	..	....	*	*	*	*	*	*	?	N. Grenada..	
....	..	....	..	....	*	*	....	*	....	....	....	Guadalupe ..	
*	*	*	..	....	....	*	....	....	....	....	....	Manatee R....	

TABLE II. B.—*List of Pelecypods*—Continued.

Ser. No.	Name and authority for species.	P.	Fig.	Alt. of Lam.	Range in Alpha.	Northern extreme range.
	Family TEREDINIDÆ.					
	Genus TEREDO Linné.					
490	T. norvegica Spengler	92	2			New York.
491	T. navalis Linné	91	3			Arctic Sea.
492	T. megotara Hanley	91	3			Arctic Sea.
493	T. Thomsoni Tryon	93	4			Cape Cod.
494	T. dilatata Stimpson	92	1			Cape Ann.
	Subgenus **Lyrodus** Gould.					
495	L. chlorotica Gould	92	3			Mass. Bay.
	Genus XYLOTRYA Leach.					
496	X. fimbriata Jeffreys	93	1			Rhode Island
497	X. bipunnata Jeffreys					N. Atlantic.

TABLE II. B.—*List of Pelecypoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Ber. mu- da.	Eur.	West Am.	Southern extreme range.	Range in time
*	--	....	--	....	....	*	....	....	....	*	....	Manatee	
*	--	....	--	....	....	*	*	....	....	*	....	Florida	
*†	*	*	--	....	....	....	....	....	....	*	....	S. Carolina ..	P. Pliocene.
*	--	....	--	....	*	*	....	....	....	....	....	?	
.	*	*	--	....	....	....	....	....	....	....	....	S. Carolina ? .	
*	--	....	--	....	....	*	....	....	....	....	....	Gulf of Mex.	
*	*	*	*	....	*	*	*	....	....	*	*	Gulf of Mex.	
....	--	....	--	....	....	*	....	*	....	*	....	St. Vincent..	

TABLE III. C.—*List of Scaphopoda.*

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range
	Class SCAPHOPODA.					
	Order SOLENOCONCHIA.					
	Family DENTALIIDÆ.					
	Genus DENTALIUM Linné.					
1	D. agile Sars				400	Norway
2	D. perlongum Dall	27	6	80.0	237/1191	Hatteras
3	D. filum Sowerby				17/1053	Scotland
4	D. callipeplum Dall	27	12b	61.5	16/175	S. Carolina
5	D. matara Dall			41.0	16/111	C. Lookout
6	D. leptum Bush	41	18a	31.5	18/81	Hatteras
7	D. antillarum Orbigny				17/1858	Nova Scotia
8	D. calamus Dall			19.5	4	Turtle Harb
9	D. taphrium Dall			17.0	33/192	Hatteras
10	D. candidum Jeffreys	46	16, 17	90.0	410/1720	N. Atlantic
11	D. sericatum Dall	26	1	13.0	640	Gulf of Mex.
12	D. carduus Dall	27	3	87.0	118/338	Florida Str.
13	D. disparile Orbigny				8/106	Tampa
14	D. ceratum Dall	26 27	5) 2)	30.0	80/1057	Gulf of Mex.
15	D. Gouldii Dall	26	4	28.0	18/140	S. Carolina
16	D. platamodes Watson				330/450	Florida Str.
17	D. ceras Watson				102/1065	Gulf of Mex.
18	D. capillosum Jeffreys				119/1800	N. Atlantic
19	D. laqueatum Verrill	27 46	17 18)	45.0	60/200	Chesapeake
20	D. compressum Watson				111/400	Cedar Keys
21	D. ophiodon Dall	26	9	12.5	100/310	Gulf of Mex.
22	D. callithrix Dall	27	10	43.0	161/1691	Cape Fear
23	D. ensiculus Jeffreys	27	12	20.0	320/1765	N. Atlantic
24	D. teres Jeffreys			9.0	843/1890	N. Atlantic
	Genus CADULUS Philippi.					
25	C. quadridentatus Dall	27	5	10.0	7/50	Hatteras
26	var.? incisus Bush	41	20	8.0	7/76	Hatteras
27	*C. cylindratus* Jeffreys			7.3	653/1605	N. Atlantic
28	C. æqualis Dall	27	9	15.0	339	Tortugas
29	C. spectabilis Verrill	46	19	22.0	464/1894	Rhode Island
30	C. grandis Verrill	46	20	15.0	843/1467	Nantucket
31	C. poculum Dall			13.2	464/810	Gulf of Mex.
32	C. Watsoni Dall	27	12a	13.0	355/1005	Gulf of Mex.
33	C. Jeffreysi Monterosato			5.0	100/843	N. Atlantic

TABLE III. C.—*List of Scaphopoda.*

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern. extreme range.	Range in time.
....	..	....	..	....	†	....	....	†	....	†	....	Florida Str..	
....	..	†	..	†	†	†	....	†	....	....	....	St. Vincent..	
....	..	†*	..	....	....	....	....	....	....	†	....	Cape Fear ..	Pliocene.
....	..	†	..	....	....	†	....	†	....	....	....	Grenada.....	
....	..	*	..	....	....	†*	....	*	....	....	....	Haiti	
....	..	*	..	....	*	*	....	....	....	....	....	C. Romano ..	
....	..	†	..	....	†	†	*	†	....	....	....	Barbados....	
....	..	....	..	....	*	....	....	....	....	....	....	Florida Str..	
....	..	*	..	....	†	*	....	†	....	....	....	Cuba.....	
†	†	†	..	....	....	....	....	....	....	....	....	Cape Fear...	
....	..	....	..	....	....	....	†	†	....	....	....	Yucatan.....	
....	..	....	..	†	....	....	*	†	....	....	....	Grenada	
....	..	....	..	....	*	*	....	*	....	....	....	Barbados....	
....	..	....	..	....	†	†	....	†	....	....	....	Barbados....	
....	..	*	..	....	†	....	....	*	....	....	....	Aspinwall...	
....	..	....	..	†	....	....	....	†	....	....	....	Culebra	
....	..	....	..	....	....	†	....	†	....	....	†	Martinique ..	
....	..	....	..	....	†	....	....	†	....	....	....	Barbados....	
....	†	†	..	....	†	†	....	†	....	....	....	Grenada	
....	..	....	..	....	†	†	....	†	....	....	....	Culebra	
....	..	....	..	....	†	†	....	†	....	....	....	Barbados....	
....	..	†	..	....	†	†	....	†	....	....	....	Grenada.....	
†	†	....	†	....	†	....	....	†	....	†	....	Barbados....	
†	..	†	..	....	....	....	....	....	....	†	....	Hatteras	
....	..	*	*	....	....	*	....	....	....	....	....	West Florida	
....	..	*	..	....	....	....	....	....	....	....	....	.....	
?	..	....	..	....	....	....	....	....	....	†	....	Rhode Island	
....	..	....	..	....	†	....	....	....	....	....	....	Florida Str..	
†	†	....	..	....	....	....	....	†	....	....	....	St. Vincent..	
†	..	†	..	....	....	....	....	....	....	....	....	Hatteras	
....	..	....	..	....	....	....	†	†	....	....	....	St. Vincent..	
....	..	....	..	....	....	....	†	†	....	....	....	Old Provid'ce	
†	..	†	..	....	....	....	....	†	....	†	....	Barbados....	

TABLE III. C.—*List of Scaphopoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Genus CADULUS—Continued.					
34	C. carolinensis Bush	41	19	9.5	$\frac{15}{181}$	Hatteras
35	C. Agassizii Dall	27	12*c*	9.0	229	Florida Str.
36	C. Pandionis Verrili	64	126	.....	$\frac{17}{300}$	Rhode Island
37	C. lunula Dall	27	8	6.0	$\frac{18}{805}$	C. Lookout
38	C. obesus Watson	....	.....	.....	$\frac{330}{390}$	Florida Str.
39	C. amiantus Dall	27	7	5.75	$\frac{8}{1003}$	Cape Florida
40	C. cucurbita Dall	27	12*d*	4.0	$\frac{394}{310}$	Fernandina
41	C. gracilis Jeffreys	....	.....	.....	$\frac{620}{843}$	N. Atlantic
42	*C. acus* Dall	27	11	8.0	30	.....
43	C	....	.....	.....	731	Hatteras
44	C. minusculus Dall	....	.....	2.2	$\frac{63}{194}$	Hatteras

TABLE III. C.—*List of Scaphopoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	*	†	....	....	....	....	†	....	....	....	Old Provid'ce	
....	..	....	..	....	†	....	....	†	....	....	....	Cuba.....	
....	..	†	†	†	....	....	....	....	....	†	....	Florida Str..	
....	..	*	..	....	†	....	....	†	....	....	....	Barbados....	
....	..	....	..	....	†	....	....	†	....	....	....	St. Thomas..	
....	..	....	..	....	*	....	....	†	....	....	....	Cuba	
....	..	....	†	....	†	....	....	†	....	....	....	Florida Str..	
....	..	†	..	....	....	....	....	....	....	†	....	Hatteras	
....	..	....	..	....	....	....	....	†	....	....	....	Haiti	
....	..	†	†	....	....	....	....	....	....	....	....	Fernandina .	
....	..	†	†	....	....	....	....	....	....	....	....	Fernandina .	

TABLE IV. D.—*List of Pteropoda.*

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Order PTEROPODA.					
	Suborder THECOSOMATA.					
	Genus LIMACINA Cuvier.					
	Section HETEROFUSUS Fleming.					
1	L. trochiformis Soul	....	.....	1.0	Pelagic	N. lat. 42°..
2	L. bulimoides Orb	....	.....	2.0	Pelagic	N. lat. 35°..
3	L. Lesueuri Orb	....	.....	1.5	Pelagic	N. lat. 38°..
4	*L. retroversa* Flem	....	.....	2.5	Pelagic	Arctic Sea.
	Section LIMACINA s. s.					
5	L. helicina Phipps	48	14	3.0	Pelagic	Arctic Sea.
	Subgenus **Embolus** Jeffreys.					
6	E. inflatus Orbigny	....	.....	1.5	Pelagic	N. lat. 42°..
7	E. triacanthus Fischer	....	.....	4.5	Pelagic	N. lat. 38°..
	Genus PERACLE Forbes.					
8	P. reticulata Orbigny	....	.....	4.0	Pelagic	N. lat. 37°..
9	var. diversa Monterosato	....	.....	7.5	Pelagic	N. lat. 31°..
10	*P.? helicoides* Jeffreys	....	.....	10.0	Pelagic	N. lat. 57°..
	Family CAVOLINIIDÆ.					
	Genus CRESEIS Rang.					
11	C. virgula Rang	....	.....	6.0	Pelagic	N. lat. 41°..
12	C. conica Eschscholtz	66	112	7.0	Pelagic	N. Atlantic
13	C. recta Blainville	66	118	25.0	Pelagic	N. lat. 48°..
	Section BOASIA Dall.					
14	C. chierchiæ Boas	....	.....	2.5	Pelagic	N. lat. 31°..
	Genus CLEODORA Pér. and Les.					
	Subgenus **Hyalocylix** Fol.					
15	H. striata Rang	66	119	6.0	Pelagic	N. lat. 39°..
	Subgenus **Styliola.**					
16	S. subula Quoy & Gaimard	....	.....	10.0	Pelagic	N. lat. 41°..
	Subgenus **Cleodora** s. s.					
17	C. pyramidata L	....	.....	15.0	Pelagic	Spitzbergen
18	C. cuspidata Bosc	....	.....	16.0	Pelagic	N. lat. 60°..

TABLE IV. D.—*List of Pteropoda.*

N. J.	Va	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
*	*	*	*	*	*	.....	....	*	*	*	?	S. lat. 28°	
....	*	*	*	*	*	.....	....	*	*	*	?	S. lat. 48°	P. Pliocene.
*	*	*	*	*	*	.....	....	*	*	*	*	S. lat. 36°	P. Pliocene.
?	...	....	...	....	.....	.....	....	.....	....	*	.....	N. lat. 40° ...	P. Pliocene.
?	...	....	...	....	.....	....	....	.....	....	*	*	N. lat. 35° ...	
*	...	....	*	...	.....	*	....	*	*	*	-	S. lat. 40°	P. Pliocene.
....	...	....	*	...	.....	.....	....	*	*	*	.....	N. lat. 18° ...	Pliocene.
*	...	....	*	*	*	*	....	*	*	*	?	S. lat. 9°	P. Pliocene.
....	...	....	*	*	*	....	....	*	*	*	....	N. lat. 28° ...	Pliocene.
....	...	....	?	....	.....	....	....	.....	....	*	.....	N. lat. 31° ...	P. Pliocene.
*	*	*	*	*	*	*	....	*	*	*	*	S. lat. 35°	P. Pliocene.
*	*	*	*	...	.....	.....	....	.....	....	*	*	Equator.....	P. Pliocene.
....	*	*	*	*	-	.....	...	*	*	*	?	S. lat. 40°	P. Pliocene.
....	...	....	*	....	....	....	....	.....	....	*	.....	N. lat. 8°	
*	...	....	*	*	.....	....	....	*	*	*	?	S. lat. 40°	P. Pliocene.
*	*	*	*	*	*	*	*	*	*	*	*	S. lat. 40°	P. Pliocene.
*	*	*	*	*	*	*	*	*	*	*	?	S. lat. 40°	P. Pliocene.
*	*	*	*	*	*	....	....	.....	....	*	?	S. lat. 42°	P. Pliocene.

TABLE IV. D.—*List of Pteropoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt or Lon.	Range in depth.	Northern extreme range.
	Section BALANTIUM Benson.					
19	C. recurva Children	....	.....	28.0	.....	N. lat. 40°..
20	C. falcata Pfeffer	....	.....	10.0	Pelagic	Davis Str.
	Genus CUVIERINA Boas.					
21	C. columnella Rang	66	117	12.0	Pelagic	N. lat. 43°..
	Genus CAVOLINIA Abild.					
	Section DIACRIA Gray.					
22	C. trispinosa Lesueur	66	115	11.0	Pelagic	N. lat. 60°..
22*a*	?C. Hargeri Verrill	....	.....	.....	.....	Geo. Bks...
	Section CAVOLINIA s. s.					
23	C. quadridentata Lesueur	....	.....	4.0	Pelagic	N. lat. 40°..
24	C. longirostris Lesueur	....	.....	7.0	Pelagic	N. lat. 47°..
25	C. gibbosa Rang	....	.....	11.0	Pelagic	N. lat. 43°..
26	C. tridentata Forskäl	66	113	18.0	Pelagic	N. lat. 40°..
27	C. uncinata Rang	66	116	7.0	Pelagic	N. lat. 40°..
28	C. inflexa Lesueur	...	.....	7.0	Pelagic	N. lat. 42°..
	Family CYMBULIIDÆ.					
	Genus COROLLA Dall.					
	(Cymbuliopsis Pelseneer.)					
29	*C. calceola* Verrill	66	120	45.0	Pelagic	N. lat. 40°..
	Suborder GYMNOSOMATA.					
	Family CLIONIDÆ.					
	Genus CLIONE Pallas.					
30	*C. limacina* Phipps	66 72	122 1	30.0	Pelagic	Arctic Sea.
	Family CLIOPSIDÆ.					
	Genus CLIOPSIS Troschel.					
31	C. grandis Boas	....	.....	25.0	Pelagic	N. lat. 46°..
	Genus NOTOBRANCHÆA Pels.					
32	N. Macdonaldi Pels	....	....	12.0	Pelagic	N. lat. 39°..
	Family PNEUMODERMATIDÆ.					
	Genus PNEUMODERMON Cuvier.					
3	*P. violaceum* Orbigny	....	.....	10.0	Pelagic	N. lat. 45°..

TABLE IV. D.—*List of Pteropoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
*	...	....	*	*	*	*	....	*	....	....	.....	S. lat. 33°	P. Pliocene.
?	...	....	?	....	.....	.....	?	.....	?	*	.....	Brazil	
*	*	*	*	*	*	*	*	*	*	*	?	S. lat. 40°	P. Pliocene.
....	*	*	*	*	*	*	....	*	*	*	*	S. lat. 40°	P. Pliocene.
....	...	*	...	*	....	.....	.....	*	....	....	.....	Bahamas	
*	*	*	*	*	*	.....	....	*	*	*	*	S. lat. 17° ...	P. Pliocene.
*	*	*	*	*	*	.....	....	*	*	*	?	S. lat. 40° ...	P. Pliocene.
*	*	*	*	*	*	.....	....	*	*	*	*	S. lat. 41° ...	P. Pliocene.
*	*	*	*	*	*	.....	....	*	*	*	*	S. lat. 40° ...	P. Pliocene.
*	...	....	*	*	*	*	....	*	....	*	*	S. lat. 40° ...	P. Pliocene.
*	...	.....	*	*	*	*	....	*	*	*	*	S. lat. 42° ...	P. Pliocene.
*	...	....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
*	*	....	....	.....	.....	.....	.....	.....	....	*	*	N. lat. 37° ...	
*	*	*	....	.....	.....	.....	....	.....	....	....	.....	China Sea...	
*	*	*	....	.....	.....	.....	....	?	?	?	....	.....	
*	...	....	....	.....	....	.....	....	....	*	*	.....	S. lat. 15° ...	

TABLE V. E.—*List of Gastropoda.*

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Class GASTEROPODA.					
	Subclass ANISOPLEURA.					
	Superorder EUTHYNEURA.					
	[**Order PTEROPODA.** *See separate table.*]					
	Order OPISTHOBRANCHIATA.					
	Suborder TECTIBRANCHIATA.					
	Family ACTÆONIDÆ.					
	Genus ACTÆON Montfort.					
1	A. exilis Jeffreys				$\frac{150}{1150}$	N. Atlantic
2	A. pusillus Forbes				$\frac{111}{150}$	N. Atlantic
3	A. punctostriatus C. B. Adams	41 52	17 22		$\frac{7}{63}$	Cape Cod
4	A. Cumingi A. Adams					Cape Fear
5	A. delicatus Dall	17	5	10.0	$\frac{13}{400}$	Gulf of Mex.
6	A. melampoides Dall	17 46	2 15	6.0 8.0	$\frac{310}{1574}$	Virginia
7	A. perforatus Dall	18	3	7.75	339	Florida Str.
8	A. Dauaida Dall	17	12	11.0	339	Tortugas
9	A. incisus Dall	17	1, 1b	9.0	$\frac{324}{640}$	Fernandina
	Genus OVULACTÆON Dall.					
10	O. Meekii Dall	33	3, 4	5.5	$\frac{400}{450}$	Fernandina
	Family RINGICULIDÆ.					
	Genus RINGICULA Deshayes.					
	Section RINGICULINA Monts.					
11	R. nitida Verrill	37	3	7.5	$\frac{19}{1075}$	Rhode Island
12	R. semistriata Orbigny				$\frac{31}{107}$	Hatteras
	Family TORNATINIDÆ.					
	Genus TORNATINA A. Adams.					
13	T. bullata Kiener					Florida Str.
14	T. recta Orbigny					Tampa
15	T. canaliculata Say	52	27	5.0	$\frac{0}{63}$	Cape Cod
16	T. Candei Orbigny	41	13		$\frac{7}{76}$	Hatteras
	Subgenus **Coleophysis** Fischer.					
17	C. perplicatus Dall			5.0	$\frac{100}{220}$	Florida Str.
18	C. eburneus Verrill	46	14	6.0	$\frac{18}{78}$	Hatteras

TABLE V. E.—*List of Gastropoda.*

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Ber-mu-da.	Eur.	West Am.	Southern extreme range.	Range in time.
†	..	....	..	†	....	....	....	†	....	†	....	Campeche...	Pliocene.
....	..	....	..	....	†	†	....	†	....	†	....	Havana.....	
....	..	†*	..	*	*	*	....	*	....	....	....	Haiti	P. Pliocene.
....	..	....	..	....	*	....	....	*	....	....	....	Rio	
....	..	....	..	....	†	*	....	†	....	....	....	Barbados....	
....	†	†	..	....	†	....	....	†	....	....	....	Cuba.....	
....	..	....	..	....	†	....	....	†	....	....	....	Cuba.....	
....	..	....	..	....	†	....	....	†	....	....	....	Cuba.....	
....	..	....	†	....	....	....	†	†	....	....	....	Yucatan.....	
....	..	....	†	....	....	....	....	†	....	....	....	Bahamas	
....	..	....	†	....	*†	†	....	†	†	†	....	Brazil.....	Pliocene.
....	..	†	..	....	....	....	....	*	....	....	....	Jamaica	
....	..	....	..	....	*	....	....	*	....	....	....	Trinidad	
....	..	....	..	....	*	*	....	*	....	....	....	Jamaica	
*	..	*	*	*	*	*	....	*	....	....	....	Haiti	Pliocene.
....	..	*	..	....	*	*	....	*	....	....	....	Martinique..	
....	..	....	..	....	†	....	....	†	....	....	....	Barbados....	
....	..	†	..	*	*	....	....	....	....	....	....	Florida Keys	

TABLE V. E.—*List of Gastropoda*—Continued.

Nos.	Name and authority for species.	Pl	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Subgenus Cylichnella Gabb.					
19	C. bidentata Orbigny	41	14	.....	7/168	Hatteras
20	C. oryza Totten	52	23	3.07	.....	Cape Cod
	Genus UTRICULUS Brown.					
21	U. Friele Dall	17	4	8.2	100/640	Gulf of Mex.
22	U. vortex Dall	17 44	3 15	7.5 10.0	866/839	Rhode Island
23	U. *domitus* Dall	17	8	9.0	382/1891	.....
	Subgenus Retusa Brown.					
24	R. Gouldii Couthouy	72	7	3.0	5/12	Maine
25	R. pertenuis Mighels	52 72	25, 26 6	2.7	10/294	Norway
26	R. sulcata Orbigny	....	.....	.....	14/31	Hatteras
27	R. ovata Jeffreys	....	.....	.....	37/1000	N. Atlantic
28	R. obesiuscula Brugnone	....	.....	.....	63/168	Rhode Island
29	R. cælata Bush	41	15	3.0	16/294	Hatteras
	Genus VOLVULA A. Adams.					
30	V. acuta Orbigny	41	11	2.5	14/63	Hatteras
31	V. oxytata Bush	41	12	4.0	8/63	Hatteras
32	V. Bushii Dall	....	.....	4.6	124	Hatteras
33	V. aspinosa Dall	....	.....	4.0	18/1000	Hatteras
	Family SCAPHANDRIDÆ.					
	Genus SCAPHANDER Montfort.					
34	S. punctostriatus Mighels	72	4	.....	146/1167	Norway
35	S. Watsonii Dall	17	10	8.75	84/324	Hatteras
36	S. nobilis Verrill	64	106	35.0	1309/1839	Delaware B.
	Subgenus Sabatia Bellardi.					
37	S. bathymophila Dall	17	9, 9b	16.5	224/1506	Fernandina
	Genus ATYS Montfort.					
38	A. Sandersoni Dall	17	7	6.5	8/103	Hatteras
39	A. caribæa Orbigny	....	....	.....	15/100	Hatteras
	Genus CYLICHNA Lovèn.					
40	C. Verrillii Dall	....	.....	7.5	31/294	Hatteras
41	C. alba Brown	52	21	.....	.....	Arctic Sea
	Genus DIAPHANA Brown.					
42	D. debilis Gould	52	24	3.5	6/30	Arctic Sea

TABLE V. E.—*List of Gastropoda*—Continued.

N. J.	Va.	Hat.	Ga	East Fla.	Fla. Keys.	West Fla	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
...	..	*†	..	....	*	*	*	*†	....	....	....	Barbados....	Pliocene.
*	*	*	..	....	....	....	....	....	....	....	....	Charleston ..	P. Pliocene.
....	..	....	..	....	....	....	†	†	....	...	....	Barbados....	
?	..	....	..	†	†	....	....	†	...	..	....	Cuba.....	
....	..	....	..	....	....	....	....	†	....	....	....	Guadalupe ..	
?	..	†	..	....	....	....	....	....	....	....	....	Hatteras	
*	..	....	†	....	....	....	....	....	....	*	....	Fernandina .	
..	..	*	..	....	....	....	....	*	....	....	....	Guadalupe ..	
....	..	†	..	†	*	....	....	*†	....	*†	....	Brazil	
†	..	†	..	....	....	....	....	....	....	†	....	Hatteras	Pliocene.
..	..	†*	†	....	....	....	....	....	....	....	....	Fernandina .	
....	..	*†	..	....	....	....	....	†	....	....	....	Barbados....	
....	..	†*	..	....	....	....	....	?	....	*	....	Cape Fear...	
....	..	†	..	...	....	....	....	....	....	....	....	.....	
....	..	*†	†	†	....	....	....	....	....	....	....	Florida Str ..	
†	†	†	†	†	†	†	....	†	....	†-	....	Barbados....	
....	..	†	..	....	†	†	....	†	....	....	....	Barbados....	
†	†	....	..	....	....	†	....	†	....	....	....	Jamaica.....	? Miocene.
....	..	....	†	...	....	†	†	†	....	....	....	Guadalupe ..	
...	..	*	..	....	*†	....	....	*	....	....	....	Santa Cruz ..	
....	..	*	..	..	....	....	....	†	....	...	....	Barbados....	
....	..	†*	†	....	...	....	....	....	....	....	....	Fernandina .	
?*	..	....	..	...	....	....	....	?	....	*	*	St. Thomas?.	P. Pliocene.
*	..	....	..	....	....	....	....	....	....	*	....	.....	P. Pliocene.

TABLE V. E.—*List of Gastropoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Len.	Range in depth.	Northern extreme range.
	Family APLUSTRIDÆ.					
	Genus APLUSTRUM Schum.					
	Subgenus Hydatina Schum.					
43	H. physis Linné	....	.....	.....	.....	Sarasota.....
	Subgenus Bullina Férussac.					
44	B. undata Bruguière	....	.....	.....	.....	Florida Keys.
	Family BULLIDÆ.					
	Genus BULLA Linné.					
45	B. striata Bruguière	....	.....	.....	.....	Texas.....
46	B. solida Gmelin	....	.....	.....	.....	Florida Keys.
47	B. occidentalis A. Adams	....	.....	.....	.....	Tampa.....
48	B. eburnea Dall	17	6	7.25	$\frac{107}{339}$	Hatteras....
49	B. abyssicola Dall	17	11	12.7	$\frac{339}{1181}$	Ireland.....
	Genus HAMINEA Leach.					
50	H. succinea Conrad	....	.....	.....	$\frac{9}{10}$	Texas.....
51	H. solitaria Say	52	20	10.0	.....	Mass. Bay ..
52	H. antillarum Orbigny	...	.....	.....	.....	Tampa.....
53	H. Guildingi Swainson	....	.....	.....	.....	Texas.....
54	H. Petitii Orbigny	....	.....	.....	.....	Tampa.....
	Genus CYLINDROBULLA Fischer.					
55	C. Beaui Fischer	....	.....	.....	$\frac{8}{95}$	Cedar Keys..
	Family PHILINIDÆ.					
	Genus PHILINE Ascanius.					
56	P. sagra Orbigny	41	16,16*a*	.....	$\frac{3}{50}$	Hatteras....
57	P. infundibulum Dall	....	.....	12.0	$\frac{118}{372}$	Florida Str..
58	P. sinuata Stimpson	72	2	.....	.....	Norway.....
59	P. amabilis Verrill	....	.....	.....	$\frac{119}{186}$	Rhode Island
60	P. ———	....	.....	.....	$\frac{107}{164}$	Hatteras....
61	P. flexuosa Sars	....	.....	.....	.....	Norway.....
	Family GASTROPTERIDÆ.					
	Genus GASTROPTERON Meckel.					
62	G. Meckelii? Kosse	....	.....	.....	.....	Mediterran'n.
	Family UMBRACULIDÆ.					
	Genus UMBRACULUM Schum.					
63	U. bermudense Mörch	14	9,10	10.0	.....	Bermuda....

TABLE V. E.—*List of Gastropoda*—Continued.

N. J.	Va	Hat.	Ga.	East Fla.	Fla. Keys	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	....	..	....	*	*	....	*	*	....	....	Guadalupe ..	
....	..	....	..	....	*	....	....	*	....	....	....	Tortola.....	
....	..	....	..	*	*	*	*	*	*	....	....	Barbados....	Pliocene.
....	..	....	..	....	*	....	*	*	....	....	....	Barbados....	
....	..	....	..	....	*	*	....	*	*	....	....	St. Vincent..	
....	..	†	†	....	†	....	....	†	....	....	....	Cuba.....	
....	..	....	..	†	†	†	....	†	....	†	....	Santa Cruz..	
....	..	....	..	....	*	*	*	†	....	....	....	Grenada.....	
....	..	*	*	....	....	....	....	....	....	....	....	Georgia	
....	..	....	..	....	*	*	....	*	....	....	....	Guadalupe ..	
....	..	....	..	....	*	*	*	*	....	....	....	Rio Janeiro .	
....	..	....	..	....	?	*	....	*	....	....	....	St. Thomas..	
....	..	....	..	....	*	†	....	*	....	....	....	Guadalupe ..	
....	..	*	..	....	....	....	....	*	...	....	....	Martinique ..	
....	..	....	..	....	†	....	....	†	....	....	....	Barbados....	
....	..	....	..	....	*	....	....	...	....	*	....	Marco.	
†	..	....	..	....	....	....	....	....	....	....	....	Delaware....	
....	..	†	..	....	....	....	....	....	....	....	....	C. Lookout..	
....	..	....	..	....	....	....	†	†	....	†	....	Yucatan.....	
....	..	....	..	†	....	....	....	†	....	†	....	Guadalupe ..	
....	..	....	..	....	*	....	....	*	*	....	....	Florida Str..	Pliocene.

TABLE V. E.—*List of Gastropoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Genus HYALOPATINA Dall.					
64	H. Rushii Dall			9.3		Florida Str..
	Superfamily ANASPIDEA.					
	Family APLYSIIDÆ.					
	Genus APLYSIA Linné.					
65	A. protea Rang					St. Augustine
66	A. Willcoxii Heilprin			200.0		Gasparilla...
	Superfamily NOTASPIDEA.					
	Family PLEUROBRANCHIDÆ.					
	Genus PLEUROBRANCHUS Cuvier.					
67	*P. americanus* Verrill	46	13	13.5	250	Rhode Island
	Genus PLEUROBRANCHÆA Meckel.					
68	P. tarda Verrill				$\frac{25}{640}$	Rhode Island
	Genus KOONSIA Verrill.					
69	K. obesa Verrill	43	7	128.0	$\frac{128}{312}$	Rhode Island
	Order NUDIBRANCHIATA. [Omitted.]					
	Order PULMONATA.					
	Suborder STYLOMMATOPHORA.					
	Superfamily DITREMATA.					
	Family ONCHIDIIDÆ.					
	Genus ONCHIDIUM Cuvier.					
70	O. floridanum Dall					Knight's Key
	Family VERONICELLIDÆ.					
	Genus VERONICELLA Blainville.					
71	V. floridana Binney			56.0		Charlotte H.
	Suborder BASOMMATOPHORA.					
	Superfamily AKTEOPHILA.					
	Family AURICULIDÆ.					
	Subfamily AURICULINÆ.					
	Genus AURICULA Lam.					
	Subgenus **Auriculastrum** Fischer.					
72	A. pellucens Menke	47	8	16.0		Cedar Keys..

TABLE V. E.—*List of Gastropoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	....	..	*	....	....	....	*	....	....	....	Bahamas	
....	..	....	*	....	*	*	....	*	*	....	....	N. Grenada ..	
....	..	....	..	....	....	*	....	....	....	....	....	.....	
?†	..	....	..	....	....	....	....	....	....	....	....	.....	
*†	†	....	..	....	....	....	....	....	....	....	....	Chesapeake .	
*†	..	....	..	....	....	....	....	....	....	....	....	Delaware ...	
....	..	....	..	....	*	....	....	....	?	....	....	Florida Keys.	
....	..	....	..	....	*	*	....	....	....	....	....	Florida Keys.	
....	..	....	..	....	*	*	....	*	....	....	....	Demerara ...	

TABLE V. E.—*List of Gastropoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Genus TRALIA Gray.					
73	T. pusilla Gmelin	47	5	21.0	.....	Cedar Keys..
74	T. minuscula Dall	....	.....	.....	.....	Tampa .....
	Subgenus **Alexia** Gray.					
75	A. myosotis Draparnaud	52	9	.....	.....	England ...
	Subfamily MELAMPINÆ.					
	Genus PEDIPES (Adans.) Blainv.					
76	P. mirabilis Muhlfeldt	47	17	3.6	.....	Tampa .....
77	P. elongatus Dall	47	4	4.0	.....	Marco, Fla ..
	Genus MELAMPUS Mtf.					
78	M. coffeus Linné	47	3	.....	....	Cedar Keys..
79	M. floridanus Shuttleworth	47	2	.....	.....	Tampa .....
80	M. flavus Gmelin	47	1	12.0	.....	Cedar Keys..
81	M. lineatus Say	47	9, 12	.....	.....	Mass Bay...
	Subgenus **Leuconia** Gray.					
82	L. bidentata Montagu	47	13	.....	.....	Shetland ....
	Subgenus **Detracia** Gray.					
83	D. bulloides Montagu	47	7	11.0	.....	Cedar Keys..
	Subgenus **Sayella** Dall.					
84	S. Hemphillii Dall	47	11	3.7	.....	Cedar Keys..
85	S. Crosseana Dall	47	10	2.5	.....	Egmont Key.
86	S. ———	....	.....	.....	.....	Tampa .....
	Genus BLAUNERIA Shuttlew.					
87	B. heteroclita Montagu	47	14	.....	.....	Tampa .....
	Superfamily PETROPHILA.					
	Family SIPHONARIIDÆ.					
	Genus SIPHONARIA Sby.					
	Subgenus **Siphonaria** s. s.					
88	S. alternata Say	....	.....	.....	.....	Bermuda ....
89	S. lineolata Orbigny	....	.....	.....	.....	Fernandina .
	Subgenus **Williamia** Monterosato.					
90	W. Krebsii Mörch	....	.....	.....	.....	Turtle Harb .
	Family GADINIIDÆ.					
	Genus GADINIA Gray.					
	G. carinata Dall	....	.....	.....	.....	Cuba .....

TABLE V. E.—*List of Gastropoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	....	..	....	*	*	....	*	*	....	....	Guadalupe ..	
....	..	....	..	....	*	*	....	*	....	....	....	Bahamas	
*	..	*	..	....	....	*	....	*	....	*	*	Jamaica	
....	..	....	..	....	*	*	....	*	*	....	....	Guadalupe ..	
....	..	....	..	....	*	....	....	....	....	....	....	.....	
....	..	....	..	....	*	*	*	*	....	....	....	Cayenne	P. Pliocene.
....	..	....	..	....	*	*	....	....	....	....	....	Florida Keys	
....	..	....	..	....	*	*	....	*	....	....	*	Guadalupe ..	
*	*	*	*	*	*	*	*	*	....	....	....	Tortola	
?	..	?	..	....	....	....	....	....	....	*	....	S. Carolina ?	
....	..	....	..	....	*	*	....	*	....	....	....	Antilles	
....	..	....	..	....	....	*	....	....	....	....	....	.....	
....	..	....	..	....	....	*	....	*	....	....	....	Bahamas	
....	..	....	..	....	....	*	...	*	....	....	....	Bahamas	
....	..	....	..	....	*	*	....	*	....	*	....	Porto Rico ..	
....	..	....	..	*	*	*	....	....	*	....	....	Florida Keys	
....	..	....	*	*	*	....	*	*	....	?	....	Brazil.....	
....	..	....	..	....	*	*	....	*	....	....	....	Barbados....	
....	..	....	..	....	?	....	....	*	*	....	....	Colon	

TABLE V. E.—*List of Gastropoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Superorder STREPTONEURA.					
	Order CTENOBRANCHIATA.					
	Suborder ORTHODONTA.					
	Superfamily TOXOGLOSSA.					
	Family TEREBRIDÆ.					
	Genus TEREBRA Bruguière.					
	Section HASTULA H. & A. Adams.					
92	T. hastata Gmelin	....	.....	.....	.....	Key West ...
93	T. cinerea Gmelin	....	.....	.....	.....	Texas .....
	Section SUBULA Schumacher.					
94	T. floridana Dall	....	.....	70.0	$\frac{15}{38}$	Key West ...
	Section ACUS H. & A. Adams.					
95	T. dislocata Say	....	....	57.0	.....	Maryland ...
96	T. concava Say	....	.....	19.0	.....	Hatteras ....
97	var. vinosa Dall	....	.....	18.0	.....	Hatteras ....
98	T. protexta Conrad	....	.....	21.2	$\frac{3}{16}$	Hatteras ....
99	var. lutescens Smith	....	.....	15.5	.....	Cape Fear...
100	T. nassula Dall	36	8	55.0	$\frac{84}{640}$	Gulf of Mex.
101	T. limatula Dall	....	.....	18.0	$\frac{28}{100}$	C. Lookout..
102	T. benthalis Dall	29	6	21.0	$\frac{100}{400}$	Fernandina .
103	T. Rushii Dall	....	.....	15.0	8	Florida Keys
	Family CONIDÆ.					
	Genus CONUS Linné.					
104	C. proteus Hwass	....	.....	.....	$\frac{10}{20}$	Gulf of Mex.
105	C. centurio Born	....	.....	.....	$\frac{14}{38}$	Cedar Keys..
106	C. Delessertii Recluz	....	.....	51.0	$\frac{33}{83}$	Hatteras ....
107	C. flavescens Gray	....	.....	.....	$\frac{15}{110}$	Hatteras ....
108	C. floridanus Gabb	....	.....	.....	.....	Hatteras ....
109	C. Agassizii Dall	9	8, 8*a*	30.0	$\frac{10}{115}$	Bermuda ....
110	C. Pealii Green	...	.....	.....	$\frac{9}{9}$	Hatteras ....
111	C. pygmæus Reeve	....	...	.....	.....	Magill Bay ..
112	C. verrucosus Hwass	....	....	.....	.....	Florida Keys
113	C. mus Hwass	....	.....	.....	$\frac{9}{9}$	Jupiter Inlet
114	C. amphiurgus Dall	....	.....	.....	26	Gulf of Mex.

TABLE V. E.—*List of Gastropoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	....	..	....	*	....	....	*	*	....	....	Tortola	
....	..	....	..	....	....	....	*	*	....	....	....	Barbados....	
....	..	....	..	....	†*	....	....	....	....	....	....	Florida Str..	
....	..	*	*	*	*	*	*	*	....	....	....	Venezuela...	Pliocene.
....	..	*	*	....	....	....	...	....	....	....	....	Georgia	Pliocene.
....	..	*	*	....	....	*	....	....	....	....	....	W. Florida..	
....	..	*	*	*	....	*	*	....	....	....	....	Texas	Pliocene.
....	..	*	..	....	....	*	....	....	....	....	....	W. Florida..	
....	..	....	..	....	....	†	....	†	....	....	....	Martinique..	
....	..	*	..	†	†	†	....	†	....	....	....	Barbados....	
....	..	....	..	†	†	....	....	†	....	....	....	Havana	
....	..	....	..	....	*	....	....	....	....	....	....	Cape Florida.	
....	..	....	..	*	*	*	....	*	....	....	....	Venezuela...	Pliocene.
....	..	....	..	....	....	*	....	*	....	....	....	Santa Cruz..	
....	..	†*	..	....	*	*†	....	....	....	*	....	Florida Keys	
....	..	†	..	....	*	*	....	†*	....	....	....	Barbados....	Pliocene.
....	..	*	..	*	*	*	....	....	....	....	....	Florida Keys	Pliocene.
....	..	....	..	....	....	....	....	†	*	....	....	Barbados....	
....	..	*	..	....	*	*	....	*	....	....	....	Darien	Pliocene.
....	..	....	..	....	*	*	....	*	....	....	....	Tobago.....	Pliocene.
....	..	....	..	....	*	....	....	*	*	....	....	Brazil	
....	..	....	..	*	*	....	....	*	*	....	....	Swan Islands	
....	..	....	..	....	†	....	*	....	....	....	....	Yucatan.....	

TABLE V. E.—*List of Gastropoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Family PLEUROTOMIDÆ.					
	Genus PLEUROTOMA Lamarck.					
	Subgenus **Pleurotoma** s. s.					
115	P. albida Perry	....	.....	.....	26/100	Cedar Keys..
116	var. tellea Dall	....	.....	100.0	60/110	W. Florida..
117	var. vibex Dall	....	.....	19.0	80/180	Florida Keys
118	P. periscelida Dall	32	2	40.0	107/175	Hatteras ....
	Subgenus **Leucosyrinx** Dall.					
119	L. Verrillii Dall	10	5	36.0	140/240	Cape Fear...
120	L. Sigsbeei Dall	11	10	25.5	1591	Gulf of Mex
121	L. tenoceras Dall	36	5	60.0	178/214	Cape Fear...
122	L. subgrundifera Dall	38	1	30.0	178/240	Cape Fear...
	Subgenus **Ancistrosyrinx** Dall.					
123	A. elegans Dall	38	3	27.0	805	Florida Reefs
124	A. radiata Dall	12	12	18.0	73/640	Cedar Keys..
	Subgenus **Genota** Adams.					
125	G. mitrella Dall	12	5	12.5	274/640	Fernandina .
	Section DOLICHOTOMA Bellardi.					
126	G. viabrunnea Dall	13	2	38.0	189/337	South Cuba .
	Genus DRILLIA Gray.					
127	D. ostrearum Stearns	....	.....	.....	14/170	Hatteras ....
128	D. albicoma Dall	10	8	25.7	84/114	Gulf of Mex.
129	D. detecta Dall	12	11	11.7	333/390	Gulf of Mex.
130	D. alesidota Dall	....	.....	48.0	83/107	Hatteras ....
131	var. macilenta Dall	36	1	36.0	94/114	Cape Fear...
132	D. polytorta Dall	10	6	33.5	413	Gulf of Mex.
133	*D. eucosmia* Dall	13	1	19.0	170	.....
134	var. canna Dall	....	.....	15.2	60/82	C. Lookout..
135	*D. Harfordiana* Reeve	....	.....	.....	.....	Vera Cruz.
136	D. ———	....	.....	.....	.....	Florida Keys
137	D. ebenina Dall	....	.....	.....	.....	Tortugas ....
138	D. leucocyma Dall	48	7	7.5	.....	Sarasota ....
139	D. albinodata Reeve	....	.....	.....	.....	Charlotte H.
140	D. haliostrephis Dall	13	3	20.0	84	Gulf of Mex.
141	D. acestra Dall	10	7	19.0	101/300	Gulf of Mex.
142	D. pharcida Dall	12	2	9.5	150/1002	East Florida.
143	D. acrybia Dall	....	.....	10.0	134/294	Fernandina .

TABLE V. E.—*List of Gastropoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	....	..	....	....	†*	....	†*	....	....	....	Barbados....	Miocene.
....	..	....	..	....	....	†	....	....	....	....	....	W. Florida ..	
....	..	....	..	....	†	....	....	†	....	....	....	Saba, W. Ind.	
....	..	†	..	....	....	....	....	†	....	....	....	Monosquillo.	
....	..	†	..	....	....	†	....	†	....	..	....	Guadalupe ..	
....	..	....	..	....	....	....	†	†	....	....	....	Bequia.....	
....	..	†	..	....	....	†	....	†	....	....	....	Guadalupe ..	
....	..	†	..	†	....	†	....	†	....	....	....	St. Kitt's....	
....	..	....	..	....	†	....	....	†	....	....	....	Cuba.....	
....	..	....	..	....	†	*	....	†	....	....	....	Barbados....	
....	..	....	†	....	....	....	....	†	....	....	....	Yucatan.....	
....	..	....	..	....	....	....	....	†	....	....	....	Barbados....	
....	..	*	..	....	*	*	....	†	....	....	....	Grenada.....	
....	..	....	..	....	....	†	....	†	....	....	....	Barbados....	
....	..	....	..	....	....	†	....	†	....	....	....	Culebra	
....	..	†	..	....	....	†	....	....	....	....	....	Gulf of Mex .	Pliocene.
....	..	†	..	....	....	†	....	†	....	....	....	Barbados....	
....	..	....	..	....	....	....	....	†	....	....	....	Yucatan.....	
....	..	....	..	....	....	....	....	†	....	....	....	Grenada....	
....	..	†	..	....	....	†	....	†	....	....	....	Grenada.....	
....	..	....	..	....	....	....	†	*	....	....	....	Yucatan	
....	..	....	..	....	*	....	....	*	....	....	....	Costa Rica ..	
....	..	....	..	....	*	....	....	....	....	....	....	Vera Cruz...	Pliocene.
....	..	....	..	....	*	*	....	....	....	....	....	Yucatan	Pliocene.
....	..	....	..	....	*	*	....	*	....	....	....	St. Domingo.	
....	..	....	..	....	*	†	....	....	....	....	....	Gulf of Mex.	
....	..	....	..	....	....	†	....	*	....	....	....	Grenada	
....	..	....	..	†	†*	†	....	†	....	....	....	Barbados....	
....	..	....	†	†	....	....	....	....	....	....	....	East Florida	

TABLE V. E.—*List of Gastropoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
144	Drillia tristicha Dall	....	.....	23.0	111/10	Cedar Keys..
145	D. ebur Reeve	....	.....	.....	1/8	Hatteras ....
146	D. fucata Reeve	....	.....	.....	1/8	Cape Fear...
147	var. paria Reeve	....	.....	.....	1/8	Cape Fear...
148	D. pagodula Dall	13	6	18.0	50/154	Florida Str..
149	var. pentagonalis Dall	....	.....	7.0	49	Hatteras ....
150	D. thea Dall	48	1	15.0	3/15	Hatteras ....
151	var. carminura Dall	....	.....	11.5	100/111	Gulf of Mex.
152	D. Simpsoni Dall	....	.....	.....	5/15	Hatteras ....
153	D. lissotropis Dall	11	3,4	7.0	73/248	Gulf of Mex.
154	D. Dalli Verrill	60	66, *a*	19.5	94/146	Rhode Island
155	var. acloneta Dall	....	.....	.....	170/294	Georgia .....
156	var. cestrota Dall	....	.....	.....	196	Cedar Keys..
157	D. nucleata Dall	11	1	13.5	54/464	Cape Florida
158	D. Verrillii Dall	11	2	5.5	310/310	Gulf of Mex.
159	D. havanensis Dall	11	5	9.0	263/640	Florida Keys
160	D. premorra Dall	11	18	9.5	100/400	Fernandina .
161	D. oleacina Dall	11	8	10.0	287/340	Florida Str..
162	D. smirna Dall	11	7	15.0	284/412	Florida Str..
163	D. lithocolleta Watson	11	6	12.5	107/789	Hatteras ....
	Section CYMATOSYRINX Dall.					
164	D. centimata Dall	36	9	22.5	731/1930	Hatteras ....
165	D. æpynota Dall	36	10	15.0	25/120	Hatteras ....
166	D. Moseri Dall	36	3	30.0	3/60	Hatteras ....
167	D. ———	....	.....	.....	15	Florida Keys
168	D. ———	....	.....	.....	234/465	Georgia .....
169	D. ———	....	.....	.....	294	Georgia .....
	Genus BORSONIA Bellardi.					
	Subgenus Cordieria Rouault.					
170	*C. Rouaultii* Dall	36	11	13.6	100	.....
	Genus BELA Gray.					
171	B. subvitrea Verrill	....	.....	13.5	843	Hatteras ....
172	B. tenuicostata G. O. Sars	....	.....	.....	843/1290	Norway .....
173	B. ———	....	.....	.....	465	Florida Str..
174	B. Blakei Verrill	....	.....	16.0	2021	Chesapeake .
175	B. ———	....	.....	.....	124	Hatteras ....
176	B. harpularia Couthouy	50	17	17.0	10/368	Nova Scotia .
77	B. ———	....	.....	.....	63/168	Hatteras ....
78	B. Rathbuni Verrill	....	.....	27.0	1395	Hatteras ....

TABLE V. E.—*List of Gastropoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	....	..	....	....	†	....	....	....	....	....	Gulf of Mex.	
....	..	*	*	....	†	†	...	†	....	....	....	Sombrero ...	
....	..	*	..	....	....	....	....	†	....	....	....	St. Thomas..	
....	..	*	..	....	....	....	....	†	....	....	....	Trinidad	
....	..	....	..	....	†	†	....	†	....	....	....	Barbados....	
....	..	†	..	....	*	....	....	....	....	....	....	Florida Keys	
....	..	*	*	....	*	*	....	....	....	....	....	Florida Keys	
....	..	....	..	....	....	†	....	†	....	....	....	Barbados....	
....	..	*	..	....	....	*	....	....	....	....	....	Tampa	
....	..	....	..	....	†	†	....	†	....	....	....	Barbados....	
†	..	....	†	†	....	....	....	....	....	....	....	Georgia	
....	..	....	†	....	....	....	....	†	....	....	....	Martinique..	
....	..	....	..	....	....	†	....	....	....	....	....	Gulf of Mex.	
....	..	....	..	....	†	....	....	†	....	....	....	Sombrero ...	
....	..	....	..	....	....	†	....	....	....	....	....	W. Florida ..	
....	..	....	..	....	†	....	....	†	....	....	....	Yucatan	
....	..	....	†	....	†	....	....	†	....	....	....	Havana	
....	..	....	..	....	†	....	....	†	....	....	....	Grenada	
....	..	....	..	....	†	....	....	†	....	....	....	Old Provid ..	
....	..	†	..	....	....	†	....	....	....	....	....	Cedar Keys..	
....	..	†	..	....	....	†	....	....	....	....	....	Cedar Keys..	
....	..	†	..	....	....	....	....	....	....	....	....	N. Carolina..	
....	..	†	..	....	*	*	....	....	....	....	....	Florida Keys	
....	..	....	..	....	†	....	....	....	....	....	....	Florida Keys	
....	..	....	†	†	....	....	....	....	....	....	....	Florida Str..	
....	..	....	†	....	....	....	....	....	....	....	....	Fernandina .	
....	..	....	..	....	....	....	....	†	....	....	....	Barbados....	
....	..	†	..	....	....	....	....	....	....	....	....	.....	
†	..	†	..	....	....	....	....	....	....	†	....	Hatteras	
....	..	....	..	†	....	....	....	....	....	....	....	.....	
†	†	....	..	....	....	....	....	....	....	....	....	.....	
....	..	†	..	....	....	....	....	....	....	....	....	.....	
*	..	....	..	....	....	....	....	....	....	....	....	New York ...	
....	..	†	..	....	....	....	....	....	....	....	....	.....	
....	..	†	..	....	....	....	....	....	....	....	....	.....	

TABLE V. E.—*List of Gastropoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
179	Bela ——	....	.....	.....	300	Hatteras ....
180	B. subturgida Verrill	....	....	9.0	843	Hatteras ....
181	B. ——	....	.....	....	63 to 124	Hatteras ....
182	*B. Tanneri* Verrill	61	78	21.0	1290	Gulf of Maine
	Genus MANGILIA Risso.					
	Subgenus **Cythara** Schumacher.					
183	C. Bartlettii Dall	12 14	6 5, 8	8.0 10.0	0 to 450	Key West ....
184	*C. cymella* Dall	12	4	12.5	198 to 220	Gulf of Mex ..
	Subgenus **Daphnella** Hinds.					
185	D. limnæiformis Kiener	....	.....	.....	.....	Florida Keys
186	D. leucophlegma Dall	9	9	10.25	805	Gulf of Mex ..
187	D. corbicula Dall	14	9	11.2	48 to 100	Hatteras ....
188	D. reticulosa Dall	10	10	11.5	76 to 294	Fernandina ..
189	D. pompholyx Dall	36	4	12.5	103 to 294	Fernandina
190	D. retifera Dall	....	.....	6.5	43 to 83	Hatteras ....
191	D. morra Dall	12	1	5.75	33 to 430	C. Lookout ..
192	D. elata Dall	....	.....	4.75	13 to 12	Hatteras ....
	Section EUBELA Dall.					
193	D. limacina Dall	9	10	11.0	85 to 405	Rhode Island
194	D. calyx Dall	....	.....	.....	124	Hatteras ....
195	D. ——	....	.....	.....	805	Gulf of Mex ..
196	D. sofia Dall	10	11	8.0	769	N. Carolina ?
197	var. hyperlissa Dall	....	.....	8.5	731	Hatteras ....
	Subgenus **Glyphostoma** Gabb.					
198	G. dentifera Gabb	....	.....	.....	15	Florida Str ..
199	G. Gabbii Dall	13	4,5,7,8	17.5	30 to 280	Gulf of Mex ..
200	G. gratula Dall	12	10	17.5	227 to 447	East Florida.
	Subgenus **Mangilia** Risso, s. s.					
201	M. balteata Reeve	....	.....	.....	.....	Hatteras ....
202	M. psila Bush	41	2	6.0	.....	Hatteras ....
203	M. oxytata Bush	41	1	5.0	48	Hatteras ....
204	M. astricta Reeve	....	.....	.....	.....	Florida Keys
205	M. biconica C. B. Adams	....	.....	.....	.....	Hatteras ....
206	M. plicosa C. B. Adams	50	14	.....	9 to 9	Cape Cod ....
207	M. rubella Kurtz & Stimpson	....	.....	.....	.....	C. Lookout ..
208	*M. bicarinata* Couthouy	50	15	11.0	0 to 420	Arctic Seas ..
209	M. stellata Stearns	....	.....	.....	.....	Tampa .....

TABLE V. E.—*List of Gastropoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	†	..	....	....	....	....	....	....	....	....	.....	
....	..	†	..	....	....	....	....	....	....	....	....	.....	
....	..	†	..	....	....	....	....	....	....	....	....	.....	
?†	..	....	..	....	....	....	....	....	....	....	....	George's B'ks	
....	..	....	..	....	*	....	....	†	....	....	....	Barbados....	
....	..	....	..	....	....	....	....	†	....	....	....	Barbados....	
....	..	....	..	....	*	....	....	*	....	....	....	Barbados....	
....	..	....	..	....	†	....	....	....	....	....	....	Gulf of Mex .	
....	..	†	..	....	....	....	....	†	....	....	....	Barbados....	
....	..	....	†	....	....	....	....	†	....	....	....	Barbados....	Pliocene.
....	..	....	†	....	....	....	....	†	....	....	....	Barbados....	
....	..	†	..	....	....	....	....	....	....	....	....	.....	
....	..	*†	..	....	†	....	....	†	....	....	....	Cuba	
....	..	*	..	....	....	....	....	....	....	....	....	Cape Fear...	Pliocene.
....	..	...	†	†	†	†	†	†	....	....	....	Brazil.....	
....	..	†	..	....	....	....	....	....	....	....	....	.....	
....	..	....	..	....	†	....	....	†	....	....	....	Cuba	
....	..	?†	..	....	....	....	....	†	....	....	....	Guadalupe ..	
....	..	†	..	..	....	....	....	?	....	....	....	.....	
....	..	....	..	....	*	....	....	....	....	....	....	.....	Miocene.
....	..	....	..	....	†	†*	....	†	....	....	....	Barbados....	Pliocene.
....	..	....	..	†	†	†	....	†	....	....	....	Old Provid'ce	
....	..	*	..	....	*	*	....	*	....	....	....	Barbados....	Pliocene.
....	..	*†	†	....	....	....	....	?	....	....	....	Martinique..	
....	..	*	..	....	....	....	....	....	....	....	....	.....	
....	..	....	..	....	*	*	....	....	....	....	....	Gulf of Mex .	
....	..	†*	..	....	*	*	....	*	....	....	....	Jamaica	
*	..	*	..	....	*	*	....	....	....	..	....	Florida Keys	Pliocene.
....	..	*	..	....	....	*	....	....	....	....	....	Charlotte H.	Pliocene.
*?	..	....	..	....	....	....	....	....	....	*†	*	Rhode Id....	
....	..	....	..	....	*	*	....	....	....	..	....	Key West ...	

TABLE V. E.—*List of Gastropoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range
210	Mangilia atrostyla Dall	41	4, 4*a*	8.75	$\frac{14}{385}$	Hatteras
211	M. limonitella Dall	48	3	7.1	$\frac{9}{8}$	Cedar Keys
212	M. cerina Kurtz & Stimpson	44	16, *a*	6.75	$\frac{3}{10}$	Cape Cod
213	M. ceroplasta Bush			5.5	$\frac{10}{17}$	Hatteras
214	M. cerinella Dall			11.8	$\frac{14}{22}$	Hatteras
215	M. quadrata Reeve			8.0		Hatteras
216	var. diminuta C. B. Adams					Hatteras
217	var. rugirima Dall					Florida Keys
218	var. *monocingulata* Dall	11	15, 16	6.75	100	
219	M. monilifera Sowerby					Florida Keys
220	*M. citronella* Dall	9	5	6.25	70	
221	M. ———					Hatteras
222	M. Dorvilliæ Gray					Florida Keys
223	M. ———				22	Hatteras
224	M. melanitica Dall					Hatteras
225	var. oxia Bush	41	3, 3*a*	5.0	$\frac{7}{48}$	Hatteras
226	M. ———				294	Fernandina
227	M. antonia Dall	10 11	4 11	5.75 7.0	$\frac{640}{769}$	Fernandina
228	M. serga Dall	9	4	9.0	$\frac{382}{1075}$	Florida Str.
229	M. peripla Dall	11	17	8.0	$\frac{640}{1000}$	Gulf of Mex.
230	M. elusiva Dall	12	7	9.25	$\frac{330}{640}$	Gulf of Mex.
231	M. bandella Dall	10 60	3 73	9.4 11.0	$\frac{384}{2100}$	Gulf of Maine
232	M. comatotropis Dall	11 44 61	12 8 77	6.0	$\frac{50}{1078}$	Rhode Island
233	M. scipio Dall	10	12	14.0	$\frac{124}{582}$	Fernandina
234	M. pelagia Dall	11	9	10.8	539	Gulf of Mex.
235	M. exsculpta Watson	15	9	30.0	$\frac{348}{640}$	Gulf of Mex.
236	M. Pourtalesii Dall	9	6	17.0	$\frac{284}{447}$	Fernandina
237	M. subsida Dall	12	3	13.0	339	Gulf of Mex.
238	M. toreumata Dall	12	8	10.2	$\frac{304}{391}$	Fernandina
	Subgenus **Pleurotomella** Verrill.					
239	*P. Packardii* Verrill	44	7	13.0	$\frac{85}{193}$	Gulf of Maine
240	var. formosa Jeffreys	60	72	10.0	$\frac{345}{1008}$	N. Atlantic
241	var. Benedicti V. & S	14 60	4 70, *a*	11.0 17.0	$\frac{1390}{1807}$	Gulf of Maine
242	*P. Bruneri* V. & S	61	75	22.0	$\frac{1608}{2033}$	Rhode Island
243	P. leucomata Dall	11	13	13.7	$\frac{533}{640}$	Cedar Keys
244	P. Catherinæ V. & S	61	76, *a*	23.0	$\frac{843}{1053}$	Gulf of Maine

TABLE V. E.—*List of Gastropoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	*	*	...	*	*	....	†	....	....	...	Barbados....	
....	..	....	..	....	....	*	....	....	....	....	....	Tampa.....	
*	..	*	*	....	....	....	....	....	....	....	....	Fernandina .	P. Pliocene.
....	..	*	..	....	....	....	....	....	....	....	....	.....	
....	..	*	..	....	*	*	*	....	....	....	....	Texas.....	
....	..	*	..	....	*	....	*	*	....	....	....	Yucatan.....	
....	..	*	..	....	*	*	....	....	....	....	....	Florida Keys.	
....	..	....	..	....	*	....	....	....	....	....	....	.....	
....	..	....	..	....	....	....	....	†	....	....	....	Barbados....	
....	..	....	..	....	*	....	....	*	....	....	....	St. Thomas..	
....	..	....	..	....	....	....	...	†	....	....	....	Sombrero....	
....	..	†	..	....	....	....	....	†	....	....	....	Barbados....	
....	..	....	..	....	*	....	....	*	....	....	....	Haiti	
....	..	*	..	....	....	....	....	....	....	....	....	.....	
....	..	*	..	....	*	*	....	*	....	....	....	Haiti	
....	..	*	..	....	....	....	....	....	....	....	....	....	
....	..	....	†	....	....	....	....	....	....	....	....	.....	
....	..	....	†	...	....	†	....	†	....	....	....	Guadalupe ..	
....	..	....	..	†	....	....	....	†	†	....	....	Old Provid'ce	
....	..	....	..	....	....	....	*	*	....	....	....	Yucatan.....	
....	..	....	..	....	....	....	*	†	....	....	....	Culebra	
†	..	...	..	....	....	†	...	†	...	....	....	Bequia.....	
....	..	†	..	†	....	†	....	†	†	....	....	Barbados....	
....	..	....	†	....	....	....	....	†	....	....	....	St. Vincent..	
....	..	....	..	....	....	†	....	....	....	....	....	Cuba.....	
....	..	....	..	....	....	†	....	†	....	....	....	Santa Cruz..	
....	..	....	†	†	....	....	....	....	....	...	....	Florida Str..	P. Pliocene.
....	..	....	..	..	....	†	....	†	....	....	....	Cuba.....	
...	..	....	†	...	....	....	....	†	...	....	....	Dominica ...	
....	..	....	..	...	....	....	....	....	....	....	....	Rhode Island	
....	..	†	..	....	....	....	....	....	....	....	....	Hatteras	
....	..	....	..	..	....	†	....	†	....	....	....	Bequia.....	
††	..	....	..	....	....	....	....	....	....	....	....	.....	
....	..	....	..	....	†	†	....	†	....	....	....	Florida Str..	
†	..	†	..	....	...	...	....	....	....	....	....	Hatteras	

TABLE V. E.—*List of Gastropoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
245	Pleurotomella Agassizii V. & S.	60	67, 71	31.0	338/1080	Rhode Island
246	var. Sandersoni Verrill	....	.....	.....	1880/2033	Gulf of Maine
247	var. mexicana Dall	11	14	8.5	402/640	Gulf of Mex.
248	*P. Edgariana* Dall	36	6	58.0	205	.....
249	*P. Pandionis* Verrill	60	69	43.0	338/419	Rhode Island
250	P. Emertonii Verrill & Smith	10, 60	9, 74	34.0	1817/2393	Chesapeake
251	P. tincta Verrill	46	4	22.0	2515/2714	Virginia
252	P. chariessa Watson	46	3	52.0	340/1710	N. Atlantic
253	var. phalera Dall	....	.....	38.0	731	Cape Fear...
254	var. aresta Dall	....	.....	28.0	731	Cape Fear...
255	var. tellea Dall	....	.....	29.0	731	Cape Fear...
256	P. filifera Dall	12	9	17.5	331	Gulf of Mex.
257	P. Frielei Verrill	46	5	22.0	1198/1198	Delaware
258	P. hadria Dall	....	.....	27.0	407/1781	Cape Fear...
259	P. Bairdii Verrill	60	68	55.0	944/2221	Rhode Island
260	P. Lottæ Verrill	46	7	11.5	1525	Delaware
	† Section GYMNOBELA Verrill.					
261	P. extensa Dall	10	2	12.2	640/1000	N. Atlantic
262	P. vitrea Verrill	46	6	8.0	384/428	Delaware
263	P. Blakeana Dall	10, 46	1, 8	8.0	100/1608	Gulf of Maine
264	var. agria Dall	....	.....	10.0	1685	Chesapeake
265	P. curta Verrill	....	.....	16.0	843/1917	Rhode Island
266	P. tornata V. var. Malmii Dall	....	.....	5.0	804/1808	Gulf of Maine
267	*P. engonia* Verrill	....	.....	17.0	806/1806	Gulf of Maine
	Subgenus **Taranis** Jeffreys.					
268	T. cirrata Brugnone	....	.....	6.0	184/605	Norway
	Genus SPIROTROPIS G. O. Sars.					
269	S. ephamilla Verrill	....	.....	.....	1817/2221	Chesapeake
	Family CANCELLARIIDÆ.					
	Genus CANCELLARIA Lam.					
	Subgenus **Cancellaria** s. s.					
270	C. reticulata Linné	....	.....	.....	5/30	Hatteras
271	C. Conradiana Dall	....	.....	.....	.....	Gulf of Mex.
	Subgenus **Trigonostoma** Blainville.					
272	T. tenera Philippi	....	.....	.....	.....	Gulf of Mex.
273	T. Smithii Dall	37	1	10.5	23/25	Hatteras
274	T. Agassizii Dall	35	4	13.5	18/25	C. Lookout

TABLE V. E.—*List of Gastropoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
†	..	†	..	....	....	....	....	....	....	....	....	Cape Fear...	
?†	..	....	..	....	....	....	....	....	....	....	....	N. lat. 38½° ..	
....	.	....	..	....	....	†	†	†	....	....	....	Martinique..	
....	..	....	..	....	....	....	....	†	....	....	....	Curaçoa.....	
?†	..	....	..	....	....	....	....	....	..	....	....	.....	
†	..	....	..	....	....	....	....	†	....	....	....	Santa Cruz..	
....	†	....	..	....	....	....	....	....	....	....	....	N. lat. 36° ...	
†	..	†	..	....	....	....	....	†	....	†	....	St. Vincent..	Pliocene.
....	..	†	..	....	....	....	....	....	....	....	....	.....	
....	..	†	..	....	....	....	....	....	....	....	....	.....	
....	..	†	..	....	....	....	....	....	....	....	....	.....	
....	..	....	..	....	....	†	....	....	....	....	....	.....	
....	..	....	..	....	....	....	....	....	....	....	....	N. lat. 39° 33′	
....	..	†	..	....	....	†	....	....	....	....	....	Gulf of Mex .	
†	..	....	..	....	....	....	....	....	....	....	....	Delaware....	
†	..	....	..	....	....	....	....	....	....	....	....	.....	
....	..	....	..	....	....	†	†	†	....	....	....	Yucatan.....	
†	..	....	..	....	....	....	....	....	....	....	....	.....	
†	†	†	..	....	....	†	....	†	....	....	....	Santa Cruz..	
†	..	....	..	....	....	....	....	†	....	....	....	Guadalupe ..	
†	†	†	..	....	....	....	....	....	....	....	....	Hatteras	
....	..	....	..	....	†	....	....	†	....	....	....	Gulf of Mex .	
?†	..	....	..	....	....	....	....	....	....	....	....	Rhode Island	
....	..	†	..	†	....	....	....	†	....	†	....	Florida Str..	Pliocene.
†	†	....	..	....	....	....	....	....	....	....	....	.....	
....	..	*	*	*	*	*	....	*	....	....	....	Guadalupe ..	P. Pliocene.
....	..	....	..	....	....	*	....	....	....	....	....	.....	Pliocene.
....	..	....	..	....	*	....	*	*	....	....	....	Yucatan	Pliocene.
....	..	*	..	....	....	....	....	....	....	....	....	C. Lookout..	
....	..	*	..	....	*	*	....	....	....	....	....	Key West ...	

TABLE V. E.—*List of Gastropoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Genus ADMETE Moller.					
275	A.? microscopica Dall	....	.....	.....	$\frac{400}{780}$	Fernandina
276	A.? nodosa Verrill	46	9	12.0	$\frac{816}{824}$	Delaware
	Genus BENTHOBIA Dall.					
277	B. Tryoni Dall	35	6	13.0	731	Cape Fear
	Superfamily RHACHIGLOSSA.					
	Family OLIVIDÆ.					
	Genus OLIVA Bruguière.					
278	O. reticularis Lamarck	....	.....	.....	$\frac{0}{73}$	Key West
279	O. literata Lamarck	34	8, 8′	60.0	$\frac{0}{1}$	Hatteras
	Genus OLIVELLA Swainson.					
280	O. mutica Say	34	1, 2	13.0	.....	.....
281	O. nivea Gmelin	....	.....	.....	$\frac{0}{8}$	Sarasota
282	O. jaspidea Gmelin	....	.....	.....	$\frac{27}{803}$	Hatteras
283	var. fuscocincta Dall	....	.....	.....	$\frac{56}{780}$	Florida Keys.
284	O. bullula Reeve	....	.....	.....	$\frac{72}{464}$	Hatteras
285	O. ———	....	.....	.....	.....	Key West
286	O. floralia Duclos	....	.....	.....	.....	Hatteras
	Family MARGINELLIDÆ.					
	Genus MARGINELLA Lamarck.					
287	M. carnea Storer	....	.....	.....	.....	Charlotte H.
288	M. Storeria Couthouy	....	.....	.....	.....	Gulf of Mex
289	M. oblonga Swainson	....	.....	.....	.....	Florida Keys.
290	M. guttata Dillwyn	....	.....	.....	.....	Hatteras
291	M. cassis Dall	35	8	15.0	101	Florida Keys.
292	M. limatula Conrad	....	.....	.....	.....	Hatteras
293	M. apicina Menke	....	.....	.....	.....	Hatteras
294	var. borealis Verrill	44 61	4 79	14.0	$\frac{64}{100}$	Rhode Island
295	M. pellucida Pfeiffer	....	.....	.....	.....	Sarasota
296	M. nivosa Hinds	....	.....	.....	.....	Key West
297	M. Watsoni Dall	19 38	3 2	9.5 9.5	$\frac{230}{803}$	Gulf of Mex.
298	M. cineracea Dall	42	6	13.0	$\frac{324}{781}$	Cape Fear
299	M. hæmatita Kiener	....	.....	.....	$\frac{37}{170}$	Gulf of Mex.
300	M. fusina Dall	19	4	8.0	$\frac{224}{640}$	Fernandina
301	M. yucatecana Dall	19	5	5.62	$\frac{126}{640}$	Florida Str.
302	M. virginiana Conrad	....	.....	.....	$\frac{10}{294}$	Chesapeake

TABLE V. E.—*List of Gastropoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	....	†	....	....	....	†	†	....	....	....	Yucatan.....	
†	..	....	..	....	....	....	....	....	....	....	....	.....	
....	..	†	..	....	....	....	....	....	....	....	....	.....	
....	..	....	..	....	*†	....	....	*†	*	....	....	Brazil.....	Pliocene.
....	..	*	*	*	*	*	*	....	....	....	....	Key West ...	Pliocene.
....	..	*	..	*	*	*	*	*	*	....	....	Trinidad	Pliocene.
....	..	....	..	....	*	*	....	*	*	....	....	Haiti	
....	..	*	*	*	*†	*	*	*†	*	....	....	Brazil.....	Pliocene.
....	..	....	..	....	*	....	....	*†	....	....	....	Barbados....	
....	..	†	..	....	†	....	....	†	*	....	....	Brazil.....	P. Pliocene.
....	..	....	..	....	*	....	....	*	....	....	....	Brazil.....	
....	..	*	..	*	*	*	....	*	*	....	....	Tortola	
....	..	....	..	....	*	*	....	*	....	....	....	Rum Cay....	
....	..	....	..	....	....	*	....	*	....	....	....	Aspinwall...	
....	..	....	..	....	*	....	....	*	....	....	....	Yucatan.....	
....	..	*	..	....	*	....	....	*	....	....	....	Swan Island.	
....	..	....	..	....	....	†	....	†	....	....	....	Cuba.....	
....	..	*	..	....	....	....	....	....	....	....	....	C. Lookout..	Miocene.
....	..	*	..	*	*	*	*	*	....	....	....	Jamaica.....	Pliocene.
†	..	†	..	....	....	....	....	....	....	....	....	Cape Fear...	
....	..	....	..	....	*	*	....	*	....	....	....	St. Thomas..	
....	..	....	..	....	†	....	....	*	....	....	....	Jamaica.....	
....	..	....	..	†	†	†	....	....	....	....	....	Yucatan.....	
....	..	†	††	....	....	....	....	....	....	....	....	Fernandina..	
....	..	....	..	....	*	....	....	†	....	....	....	Grenada	
....	..	....	†	....	....	....	....	†	....	....	....	Yucatan.....	
....	..	....	..	....	†	....	....	....	....	....	....	Yucatan.....	
....	..	*	†	....	*	*	....	....	....	....	....	Yucatan.....	Miocene.

TABLE V. E.—*List of Gastropoda*—Continued.

Sp. r. No.	Name and authority f r species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range
303	Marginella amabilis Redfield	....	.....	.....	7/25	Florida Keys.
304	M. ———	....	.....	.....	.....	Hatteras ....
305	M. bella Conrad	....	.....	.....	.....	Hatteras ....
306	M. margarita Kiener.	....	.....	.....	294	Georgia .....
307	M. ———	....	.....	.....	294	Fernandina .
308	M. ———	....	.....	.....	294	Fernandina .
309	M. fauna Sowerby	....	.....	.....	.....	Florida Keys
310	M. microgonia Dall	....	.....	.....	294	Fernandina .
311	M. denticulata Conrad	....	.....	.....	6/24	Hatteras ....
312	var. opalina Stearns	....	.....	.....	9/8	Tampa .....
313	M. aureocincta Stearns	....	.....	.....	3/4	Chesapeake .
314	M. seminula Dall	19	2	7.0	204/640	Fernandina .
315	M. ———	....	.....	.....	.....	Tampa .....
316	M. minuta Pfeiffer	....	.....	.....	6/24	Fernandina .
317	M. minima Guilding	....	.....	.....	9/27	C. Lookout ..
318	M. Redfieldii Tryon	....	.....	.....	229	Florida Str ..
319	M. fusca Sowerby	....	.....	.....	27/63	C. Lookout ..
320	M. succinea Conrad	19	6	12.0	70/1007	Fernandina .
321	M. styria Dall	....	.....	.....	84/279	Georgia .....
322	M. torticula Dall	....	.....	.....	148/279	Fernandina .
	Section VOLVARINA Hinds.					
323	M. avena Valenciennes	....	.....	.....	10/805	Key West ..
324	M. albolineata Orbigny	....	.....	.....	80/1000	Key West ...
325	M. subtriplicata Orbigny	....	.....	.....	6/171	Key West ...
326	M. lactea Kiener.	....	.....	.....	9/10	Tortugas ....
327	M. pallida Donovan	....	.....	.....	10/170	Tortugas ....
	Subgenus **Persicula** Schumacher.					
328	P. catenata Montagu	....	.....	.....	3/92	Turtle Harb.
329	var. pulcherrima Gaskoin	....	.....	.....	9/8	Florida Keys
330	P. ———	....	.....	.....	294	Fernandina .
	Subgenus **Volutella** Swainson.					
331	V. lacrimula Gould	....	.....	.....	9/400	Hatteras ....
332	V. hadria Dall	....	.....	.....	.....	Cedar Keys..
333	V. amianta Dall	....	.....	.....	14/82	C. Lookout..
334	V. ovuliformis Orbigny	....	.....	.....	.....	Cape Fear...
	Family VOLUTIDÆ.					
	Genus VOLUTA Linné.					
335	V. virescens Solander	....	.....	.....	.....	Texas .....

TABLE V. E.—*List of Gastropoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	....	..	....	†	....	....	†	....	....	....	Sombrero....	Miocene.
....	..	*	..	....	....	....	....	....	....	....	....	Cape Fear...	
....	..	*	..	....	....	....	....	....	....	....	....	Cape Fear...	Miocene.
....	..	....	†	†	....	....	....	*	....	....	....	Haiti	
....	..	....	†	....	....	....	....	....	....	....	....	.....	
....	..	....	†	....	....	....	....	....	....	....	....	.....	
....	..	....	..	....	*	....	....	*	....	....	....	Curaçoa.....	
....	..	....	†	....	†	....	....	†	....	....	....	Cuba.....	
....	..	†	†	....	*	*	....	†*	....	....	....	Barbados....	Miocene.
....	..	....	..	....	*	*	....	....	....	....	....	Key West ...	Pliocene.
....	*	*	..	*	*	*	....	....	....	....	....	Gulf of Mex .	Pliocene.
....	..	....	†	....	....	....	†	†	....	....	....	Yucatan	
....	..	....	..	....	....	*	....	....	....	....	....	Gulf of Mex .	
....	..	....	†	....	*	*	....	†*	....	*	*	Barbados....	Miocene.
....	..	*	..	....	*	*	....	*	....	....	....	Haiti	
....	..	....	..	†	†*	....	....	*	....	....	....	Cuba.....	
....	..	†	†	....	*	....	....	*	*	....	....	St. Thomas..	
....	..	....	†	....	†*	*†	....	†	....	....	....	Sombrero....	
....	..	....	†	....	....	....	....	†	....	....	....	Sombrero....	Pliocene.
....	..	....	†	....	†	....	....	....	....	....	....	N. lat. 24° ...	
....	..	....	..	....	*	....	*†	†*	*	....	....	Aspinwall...	Pliocene.
....	..	....	..	....	*	....	....	†	*	....	....	Barbados....	
....	..	....	..	....	*†	....	....	*	....	....	....	Tortola	
....	..	....	..	....	*	....	....	*	....	....	....	Tortola	
....	..	....	..	....	*†	....	....	*	*	....	....	Tortola	Pliocene.
....	..	....	..	....	*	....	....	*†	....	....	....	Brazil	
....	..	....	..	....	*	....	....	*	....	....	....	St. Thomas..	
....	..	....	†	....	....	....	....	....	....	....	....	.....	
....	..	*†	†	†*	*†	*	....	....	....	....	....	Florida Str..	
....	..	....	..	....	....	*	....	....	....	....	....	Charlotte H.	
....	..	†*	*	....	....	....	....	....	....	....	....	Fernandina .	Pliocene.
....	..	*	..	....	*	*	....	*	....	....	....	Guadalupe ..	Pliocene.
....	..	....	..	....	....	....	*	*	....	....	....	Carthagena .	

TABLE V. E.—*List of Gastropoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Genus SCAPHELLA Swainson.					
336	S. Junonia Hwass	34	5*a-e*	95.0	10/30	C. Lookout..
	Subgenus Aurinia H. & A. Adams.					
337	A. dubia Broderip	....	.....	.....	34/168	Hatteras ....
338	A. Gouldiana Dall	29	3	69.0	80/809	Cape Fear...
339	A. robusta Dall	35	2	119.0	113/280	Tampa .....
	Family TURBINELLIDÆ.					
	Genus TURBINELLA Lamarck.					
	Subgenus Cynodonta Schumacher.					
340	C. muricata Born	....	.....	.....	9/9	Florida Keys
341	*C. capitellum* Linné	....	.....	.....	.....	Florida Keys?
	Family MITRIDÆ.					
	Genus MITRA Lamarck.					
342	M. barbadensis Gmelin	....	.....	.....	.....	Key West....
343	M. nodulosa Gmelin	....	.....	.....	.....	Fort Macon..
344	M. Dupontii Kiener	....	.....	.....	.....	Florida Keys
345	M. sulcata Gmelin	....	.....	.....	.....	Jupiter Inlet
346	M. puella Reeve	....	.....	.....	.....	C. Lookout..
347	M. albocincta C. B. Adams	....	.....	.....	.....	Key West ...
348	M. Hanleyi Dohrn	....	.....	.....	.....	Florida Keys
349	var. gemmata Sowerby	....	.....	.....	.....	Charlotte H.
350	M. floridana Dall	48	5	6.0	.....	Marco.....
351	M. Swainsoni Brod. var. antillensis Dall.	38	7	80.0	7/421	C. Lookout..
352	M. straminea A. Adams	....	.....	.....	84	Gulf of Mex.
353	M. fulgurita Reeve	....	.....	.....	73/170	Cape Florida
354	M. styria Dall	15	6	19.0	73/353	Cape Florida
355	M. wandoensis Holmes	....	.....	.....	1/10	Hatteras ....
356	M. Bairdii Dall	42	7	35.0	528	Lat. 32° 24'..
357	M. torticula Dall	15	8	12.2	400	Florida Str..
	Subgenus Conomitra Conrad.					
358	C. Blakeana Dall	....	.....	.....	640?	Gulf of Mex.
359	var. lævior Dall	35	10	9.75	80/300	Gulf of Mex.
	Genus MITROMORPHA Adams.					
360	M. biplicata Dall	35	1	7.0	100/294	Fernandina .

TABLE V. E.—*List of Gastropoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	*	..	....	*	*	....	....	....	....	....	Florida Str..	P. Pliocene.
....	..	†	..	....	*	*	....	....	....	....	....	Cape Florida	
....	..	†	†	†	†	....	....	....	....	....	....	Key West ...	
....	..	....	..	....	....	†	....	†	....	....	....	Cuba.....	
....	..	....	..	....	*	....	....	*	....	....	....	Guadalupe ..	
....	..	....	..	....	?	....	....	*	...	....	....	Curaçoa.....	
....	..	....	..	....	*	....	....	....	....	....	....	Barbados....	
....	..	*	..	....	....	....	...	*	....	....	....	Darien	
....	..	....	..	....	*	....	....	?	....	....	....	?	
....	..	....	..	*	*	....	....	*	....	....	....	St. Thomas..	
....	..	†	..	....	*	....	....	*	....	....	....	Guadalupe ..	
....	..	....	..	....	*	....	....	*	....	....	....	St. Thomas..	
....	..	....	..	....	*	....	....	*	....	....	....	Haiti.....	
....	..	....	..	...	*	*	....	*	....	....	....	Jamaica.....	
....	..	....	..	....	*	....	....	....	....	....	....	Key West ...	
....	..	†	..	....	....	....	....	†	....	....	*	Grenada.....	Pliocene.?
....	..	....	..	....	....	†	....	....	....	....	....	?	
....	..	....	..	....	†	....	....	....	....	....	....	Barbados....	
....	..	....	..	....	†	†	....	†	....	....	....	Barbados....	Miocene.
....	..	†*	..	....	†	*	....	†	....	....	....	Florida Str..	Pliocene.
....	..	†	..	....	....	....	....	....	....	....	....	?	
....	..	....	..	....	†	....	....	†	....	....	....	Cuba.....	
....	..	....	..	....	....	....	†	†	....	....	....	Yucatan	Miocene.
....	..	....	..	....	†	....	....	†	....	....	....	Yucatan	
....	..	....	†	....	....	....	....	†	....	....	....	Barbados....	

TABLE V. E.—*List of Gastropoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Family FASCIOLARIIDÆ.					
	Genus FASCIOLARIA Lamarck.					
361	F. gigantea Kiener	....	.....	.....	0/10	Hatteras ....
362	F. tulipa Linné	....	.....	.....	0/10	Hatteras ....
363	F. distans Lamarck	....	.....	.....	0/4	Hatteras ....
	Subgenus **Mesorhytis** Meek.					
364	M. Meekiana Dall	36	7	15.5	330/400	Gulf of Mex.
	Genus FULGUR Montfort.					
365	F. pyrum Dillwyn	....	.....	80.0	0/8	Hatteras ....
366	F. canaliculata Say	73	1	250.0	.....	Cape Cod ....
367	F. perversa Linné	....	.....	375.0	0/8	Hatteras ....
368	var. coarctata Sowerby	....	.....	112.0	.....	Florida .....
369	F. carica Linné	74	1	200.0	0/10	Cape Cod ....
370	F. eliceans Montfort	....	.....	100.0	0/8	S. Carolina..
	Genus MELONGENA.					
371	M. corona Gmelin	....	.....	75.0	0/8	Gulf of Mex.
372	M. melongena Linné	....	.....	100.0	0/60	Florida Keys.
	Genus LATIRUS Montfort.					
	Subgenus **Leucozonia** Gray.					
373	L. cingulifera Lamarck	....	.....	.....	.....	Sarasota ....
374	L. ocellata Gmelin	....	.....	.....	.....	Cedar Keys..
	Subgenus **Latirus** s. s.					
375	L. brevicaudatus Lamarck	....	.....	.....	.....	Florida Str ..
376	L. cayohuesonicus Sowerby	....	.....	.....	.....	Key West ...
377	L. infundibulum Gmelin	....	.....	. ..	.....	Tortugas ....
	Subfamily *Fusinæ*.					
	Genus FUSUS Lamarck.					
378	F. timessus Dall	....	.....	88.0	27/64	Cedar Keys..
379	F. eucosmius Dall	35	5	85.0	37/111	Cedar Keys..
380	F. Couei Petit	....	.....	.....	29/27	Charlotte H.
381	F. halistreptus Dall	35	7	80.0	338	Florida Str ..
382	F. Schrammii Crosse	....	.....	.....	407	Cape Fear...
383	F. benthalis Dall	15	10	15.0	16/1067	Florida Keys.
384	F. ———	....	.....	.....	.....	Florida Str..
385	F. amiantus Dall	15	11	17.0	805	Gulf of Mex.
386	F. æpynotus Dall	....	.....	24.0	79/84	Gulf of Mex.

TABLE V. E.—*List of Gastropoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	*	*	*	*	*	....	....	....	....	....	Florida Keys	
....	..	*	*	*	*	*	*	*	....	....	....	Carthagena	
....	..	*	*	*	*	*	*	....	?	....	....	Yucatan	
....	..	....	..	....	†	†	....	†	....	....	....	Cuba	
....	..	*†	*	*	*	*	*	....	....	....	....	Gulf of Mex.	P. Pliocene.
*	*	*	*	*	....	*	*	....	....	....	....	Gulf of Mex.	
....	..	*	*	*	*	*	*	*	....	....	....	Cuba	P. Pliocene.
....	..	....	..	....	....	*?	....	....	....	....	....	Gulf of Mex.	
*	*	*	*	*	*	*	*	*	....	....	....	St. Thomas..	Miocene.
....	..	*	*	....	*	*	....	*	....	....	....	Campeche...	
....	..	....	..	....	*	*	*	*	....	....	....	Guadalupe ..	
....	..	....	..	....	*	....	*	*	....	....	?	N. Grenada..	
....	..	....	..	*	*	*	*	*	....	....	....	Brazil.....	
....	..	....	..	....	*	*	....	*	*	....	....	Guadalupe ..	
....	..	....	..	....	*	....	....	*	....	....	....	Brazil.....	
....	..	....	..	....	*	....	....	*	....	....	....	Swan Islands	
....	..	....	..	....	*	....	....	*	....	....	?	Santa Lucia.	
....	..	....	..	....	†	*†	....	†	....	....	....	S. of Cuba ...	Pliocene?
....	..	....	..	....	†*	*†	....	†	....	....	....	Barbados....	
....	..	....	..	....	*	*	....	....	....	....	....	C. Romano ..	
....	..	....	..	†	....	....	....	†	....	....	....	Bahamas....	
....	..	†	..	....	....	....	....	†	....	....	....	Guadalupe ..	
....	..	....	..	....	*†	....	....	*†	....	....	....	Sombrero ...	
....	..	....	..	....	†	....	....	....	....	....	...	Cuba.....	
....	..	....	..	....	†	....	....	....	....	....	....	Cuba.....	
....	..	....	..	....	†	....	....	†	....	....	....	Sombrero ...	

TABLE V. E.—*List of Gastropoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
397	Fusus alcimus Dall	.....	.....	15.0	95	Gulf of Mex.
398	var. Rushii Dall	....	.....	8.5	200	Florida Str..
399	F. amphiurgus Dall	....	.....	14.0	101	Gulf of Mex.
	Family BUCCINIDÆ.					
	Genus BUCCINUM Linné.					
390	B. undatum Linné	72	12	50.0	$\frac{9}{6\,5\,0}$	Arctic Sea...
391	B. abyssorum Verrill	61	80	43.0	$\frac{48}{1\,3\,0\,9}$	N. lat. 42° ...
	Genus CHRYSODOMUS Swainson.					
	Subgenus Sipho Mörch.					
392	S. islandicus Linné	....	.....	.....	$\frac{20}{1\,6\,8\,0}$	Arctic Sea...
393	S. Stimpsoni Mörch	72	11	75.0	$\frac{16}{3\,1\,9}$	Arctic Sea...
394	S. pubescens Verrill	....	.....	60.0	$\frac{18}{6\,4\,0}$	Nova Scotia.
395	S. ———	....	.....	.....	528	Hatteras ....
396	S. pygmæus Gould	48 50	9 4	.....	$\frac{10}{6\,4\,0}$	Nova Scotia.
397	var. planulus Verrill	....	.....	.....	.....	Rhode Island
398	S. Sarsii Jeffreys	61	81	40.0	$\frac{373}{2\,0\,3\,3}$	Rhode Island
399	S. obesus Verrill	....	.....	25.0	$\frac{294}{2\,4\,3}$	Hatteras ....
400	S. glyptus Verrill	61	82	30.0	$\frac{193}{9\,6\,6}$	Rhode Island
401	S. cælatus Verrill	....	.....	30.0	$\frac{7}{7}\frac{5}{3}\frac{5}{1}$	Rhode Island
402	S. Bocagei Fischer	....	.....	21.0	1121	Spain .....
403	S. Rushii Dall	....	.....	11.0	$\frac{193}{2\,5\,4}$	Fernandina..
	Section MOHNIA Friele.					
404	S. simplex Verrill	....	.....	14.0	$\frac{99}{3\,4\,8}$	Gulf of Maine
405	*S. hispidulus* Verrill	....	.....	7.5	2033	Gulf of Maine
	Section PTYCHOSALPINX Gill.					
406	S. globulus Dall	35	12	31.0	$\frac{338}{9\,6\,6}$	Florida Str..
	Genus JUMALA Friele.					
407	J. brychia Verrill	46	10, *a*	41.0	$\frac{394}{2\,5\,7\,4}$	N. lat. 36¼° ..
	Genus LIOMESUS Stimpson.					
408	L. Stimpsoni Dall	35	11	32.5	$\frac{149}{2\,4\,7}$	S. Carolina..
	Genus PISANIA Bivona.					
09	P. variegata Gray	....	.....	.....	.....	Florida Keys.
10	P. pusio Linné	....	.....	.....	.....	Key West ...

TABLE V. E.—*List of Gastropoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	....	..	....	....	....	†	....	....	....	....	Yucatan.....	
....	..	....	..	†	†	....	....	....	....	....	....	Bahamas....	
....	..	....	..	....	†	....	....	....	....	....	....	Florida Keys	
*	..	*?	..	....	....	....	....	....	....	*	....	Charleston H	Pliocene.
*	..	†	..	....	....	....	....	....	....	....	....	Hatteras	
†	†	†	..	....	....	....	....	....	....	*†	....	S. Carolina..	
†	†	†	..	....	....	....	....	....	....	....	....	Hatteras	P. Pliocene.
†	†	†	..	....	....	....	....	....	....	....	....	S. Carolina..	
....	..	†	..	....	....	....	....	....	....	....	....	Savannah ...	
†	†	†	..	....	....	....	....	....	....	....	....	Cape Fear...	
....	..	†	..	....	....	....	....	....	....	....	....	Cape Fear...	
†	†	†	†	....	....	....	....	....	....	†	....	Fernandina .	
....	..	†	†	....	....	....	....	....	....	....	....	Fernandina .	
?	..	....	..	....	....	....	....	†	....	....	...	Jamaica	
†	..	†	..	....	....	....	....	....	....	....	....	Cape Fear...	
†	..	....	..	....	....	....	....	?	....	†	....	Africa.....	
....	..	....	†	†	†	....	....	†	....	....	....	Florida Str..	
....	..	†	..	....	....	....	....	....	....	....	....	Hatteras	
?†	..	....	..	....	....	....	....	....	....	....	....	.....	
....	..	....	..	†	†	....	....	†	....	....	....	Jamaica	
....	†	....	†	....	....	....	....	†?	....	....	....	St. Kitts? ...	
....	..	†	..	....	....	....	....	....	....	....	....	S. Carolina..	Pliocene.
....	..	....	..	....	*	....	....	*	*	....	....	Trinidad	
....	..	....	..	....	*	....	....	*	....	....	....	Darien	

TABLE V. E.—*List of Gastropoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Subgenus Tritonidea Swainson.					
411	T. tincta Conrad	....	.....	.....	.....	Hatteras ....
412	T. cancellaria Conrad	....	.....	.....	.....	Jupiter Inlet
413	T. Orbignyi Payraudeau	....	.....	.....	33/15	Gulf of Mex.
414	T. limbata Philippi	....	.....	.....	24	Gulf of Mex.
	Genus PHOS Montfort.					
415	P. Candei Orbigny	....	.....	.....	25/100	Hatteras ....
416	P. parvus C. B. Adams	48	6	13.2	3/15	Charlotte H.
	Genus ENGINA Gray.					
417	E. turbinella Kiener	....	.....	.....	.....	Key West ...
	Genus NASSARIA Link.					
	Subgenus **Nassarina** Dall.					
418	N. Bushii Dall	15	12	9.0	15/175	Sand Key ...
419	N. glypta Bush	41	5, *a*	5.5	1/63	Hatteras ....
420	N. columbellata Dall	....	.....	12.2	124	Gulf of Mex.
421	N. Grayi Dall	32	12*a*	12.0	73/350	Gulf of Mex.
	Family NASSIDÆ.					
	Genus NASSA Lamarck.					
422	N. trivittata Say	48 50	13 7	.....	0/40	Nova Scotia.
423	N. obsoleta Say	50	9	.....	.....	Nova Scotia.
424	N. vibex Say	50	8	.....	0/2	Cape Cod ...
425	N. acuta Say	....	.....	.....	.....	N. Carolina..
426	N. ambigua Montagu	....	.....	.....	0/151	C. Lookout ..
427	N. consensa Ravenel	....	.....	.....	5/60	Hatteras ....
428	N. Hotessieri Orbigny	....	.....	.....	30/88	Hatteras ....
429	N. scissurata Dall	....	.....	.....	56/140	Florida Str ..
	Family COLUMBELLIDÆ.					
	Genus COLUMBELLA Lamarck.					
430	C. mercatoria Lamarck	....	.....	.....	0/10	C. Lookout ..
431	C. rusticoides Heilprin	....	.....	.....	.....	Cedar Keys..
	Subgenus **Anachis** Adams.					
432	A. avara Say	50	12	.....	.....	Mass. Bay ...
433	var. semiplicata Stearns	....	.....	.....	.....	Cedar Keys..
434	var. translirata Ravenel	....	.....	.....	.....	New York ...
435	var. similis Ravenel	....	.....	.....	.....	C. Lookout ..
436	A. haliæeti Jeffreys	....	.....	.....	30/640	N. Atlantic ..

TABLE V. E.—*List of Gastropoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
..	..	*	..	*	*	*	*	*	....	....	....	Vera Cruz...	
....	..	....	..	*	....	*	*	*	....	....	....	Darien	
....	..	....	..	....	....	....	*	*	....	*	....	Yucatan.....	
....	..	....	..	....	*	....	....	*	....	....	....	Cuba.....	
....	..	†	..	*	....	†	....	†	....	....	....	Darien	
....	..	....	..	*	....	....	*	*	....	....	....	Barbados....	Pliocene.
....	..	....	..	...	*	....	....	*	....	....	....	Jamaica.....	
....	..	....	..	....	†	....	....	†	....	....	....	Barbados....	
....	..	*†	..	....	*	....	....	....	....	....	....	Florida Keys	Pliocene.
....	..	....	..	....	....	....	†	†	....	....	....	Yucatan.....	
....	..	....	..	....	....	....	†	†	....	....	....	Barbados....	
*	*	*†	*	....	....	....	....	....	....	....	....	St. Augustine	Miocene.
*	..	*	*	*	....	*	....	....	....	....	....	Tampa	
*	*	*	*	*	*	*	....	*	....	....	....	Aspinwall...	Pliocene.
....	..	*	*	*	....	*	*	*	....	....	....	Barbados....	Pliocene.
....	..	†	..	....	*	*	....	*	*	....	....	Barbados....	Pliocene.
....	..	†*	..	....	*	*	....	....	....	....	....	Florida Keys	Pliocene.
....	..	†	..	....	†	*	....	†*	*	....	....	Barbados....	
....	..	....	†	....	†	....	....	†	....	....	....	Barbados....	
....	..	*	*	*	*	*	....	*	....	....	....	Barbados....	Pliocene.
...	..	....	..	....	*	*	....	*	....	....	....	Cuba.....	
*	..	*	*	....	....	....	....	....	....	....	....	Florida Keys	Miocene.
....	..	....	..	....	....	*	....	....	....	....	....	Charlotte H.	
*	..	*	*	*	....	....	*	....	....	....	....	Yucatan.....	
....	..	*	..	....	*	*	....	....	....	....	....	Yucatan.....	
*†	..	*	..	....	....	....	....	....	....	†	....	Hatteras	

TABLE V. E.—*List of Gastropoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
437	Anachis albella C. B. Adams					Cape Fear
438	A. samanensis Dall					Turtle Harb.
439	A. pulchella Kiener					Key West
440	A. obesa C. B. Adams					Hatteras
441	A. Hotessieriana Orbigny					Tampa
442	A. amphissella Dall	19	10c	4.0	5/4	Fernandina
443	var. Rushii Dall				5/4	Fernandina
	Subgenus **Nitidella** Swainson.					
444	N. nitidula Sowerby					Jupiter Inlet.
445	N. cribraria Lamarck					Key West
446	N. lævigata Linné					Florida Keys
447	N. parvula Dunker					Gulf of Mex.
448	N. moleculina Duclos					Florida Keys
449	var. dicomata Dall					Key West
	Subgenus **Astyris** Adams.					
450	A. lunata Say	50	17		8/12	Cape Ann
451	var. Duclosiana Orbigny				8/63	Hatteras
452	A. pura Verrill	50	13?		11/125	Rhode Island
453	A. Raveneli Dall				1/63	Hatteras
454	A. multilineata Dall				2/63	C. Lookout
455	A. diaphana Verrill	35	9	9.0	4/7	Rhode Island
456	*A. rosacea* Gould	69	1		5/60	Arctic Seas
457	A. fusiformis Orbigny					Turtle Harb.
458	A. Verrillii Dall	19	8	9.0	2/63	Fernandina
459	A. profundi Dall				3/63	Hatteras
	Subgenus **Æsopus** Gould.					
460	Æsopus Stearnsii Tryon	29	5	4.0		Cape Fear
	Subgenus **Conidea** Swainson.					
461	C. ovulata Lamarck					Florida Str.
	Family MURICIDÆ.					
	Subfamily *Muricinæ*.					
	Genus MUREX Linné.					
462	M. Beaui Fisch. & Bernardi				33/163	Cedar Keys
463	M. Cabritii Bernardi				33/164	Hatteras
464	M. messorius Reeve				3/30	Cedar Keys
	Subgenus **Chicoreus** Montfort.					
	C. rufus Lamarck				4/8	Cape Fear
	C. brevifrons Lamarck					S. Carolina

TABLE V. E.—*List of Gastropoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	*	..	....	*	*	....	*	....	....	....	Jamaica.....	
....	..	....	..	....	*	....	....	*	....	....	....	St. Thomas..	
....	..	....	..	....	*	....	....	*	....	....	....	Barbados....	
....	..	*	*	....	*	*	*	*	....	....	....	St. Thomas..	Pliocene.
....	..	....	..	?	....	*	....	*	....	....	....	Guadalupe ..	
....	..	....	†	....	....	....	....	*	....	....	....	Yucatan	
....	..	....	†	†	....	....	....	....	....	....	....	Florida Str..	
....	..	....	..	*	*	....	....	*	*	....	....	Barbados....	
....	..	....	..	....	*	....	....	*	*	....	....	Barbados....	
....	..	....	..	....	*	....	....	*	*	....	....	Aspinwall...	
....	..	....	..	....	....	....	*	*	....	....	....	Barbados....	
....	..	....	..	....	*	....	....	....	....	....	....	Key West ...	
....	..	....	..	....	*	....	....	....	....	....	....	Florida Str..	
*	*	*	..	*	*	*	....	....	....	....	....	Turtle Harb.	Pliocene.
....	..	†	*	*	*	*	....	*	....	....	....	Barbados....	
†	..	*	..	....	....	....	....	....	....	....	....	Hatteras	
....	..	†	..	†	....	....	....	....	....	....	....	Fowey Rocks	
....	..	*†	..	....	†	....	....	....	....	....	....	Cape Florida	
†	..	....	..	....	....	†	....	....	....	....	....	Gulf of Mex .	
?†	..	....	..	....	....	....	....	....	....	*	*	New York...	
....	..	....	..	....	*	....	....	*	....	....	....	Barbados....	
....	..	....	†	....	†	....	....	†	....	....	....	Pernambuco.	
....	..	†	..	....	†	....	....	*	....	....	....	Aspinwall...	
....	..	*	..	....	....	*	....	....	....	....	....	Tampa Bay..	
....	..	....	..	?	....	....	....	*	....	....	....	Barbados....	
....	..	....	..	....	†	†	....	†	....	....	....	Guadalupe ..	
....	..	†*	..	....	....	†	....	†	....	....	....	Barbados....	
....	..	....	..	....	*	*	*	*	....	....	....	Aspinwall...	
....	..	*	..	....	*	*	....	*	....	....	....	Carthagena .	Pliocene.
....	..	*	..	....	*	*	....	*	....	....	....	Carthagena .	Pliocene.

TABLE V. E.—*List of Gastropoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Subgenus **Phyllonotus** Swainson.					
467	P. pomum Gmelin	16	2	15.0		Beaufort, N.C.
468	P. fulvescens Sowerby					Hatteras
469	P. Pazi Crosse	15	1	32.0	$\frac{130}{335}$	Florida Str.
470	P. hystricinus Dall	16	4	21.0	$\frac{144}{252}$	Cuba
	Subgenus **Pteronotus** Swainson.					
471	P. macropterus Deshayes				63	Hatteras
472	P. phaneus Dall	42	1	17.0	$\frac{234}{431}$	Fernandina
473	P. tristichus Dall	15	3	15.5	$\frac{188}{450}$	Florida Str.
	Genus EUPLEURA Adams.					
474	E. caudata Say	50	11		$\frac{1}{2}$	Cape Cod
475	E. Stimpsoni Dall	42	3	12.0	$\frac{100}{294}$	Fernandina
	Genus TROPHON Montfort.					
	Subgenus **Boreotrophon** Fischer.					
476	B. vaginatus C. & J				843	N. Atlantic
477	B. abyssorum Verrill			8.0	$\frac{843}{2053}$	Rhode Island
478	B. lacunellus Dall	15	4	41.0	$\frac{337}{769}$	Cape Fear
479	*B. actinophorus* Dall	15	2	17.5	$\frac{140}{218}$	Santa Cruz
	Subgenus **Aspella** Mörch.					
480	A. hastula Reeve				14	Cape Fear
481	*A. scalarioides* Blainville					Mediterran'n
482	var. paupercula C. B. Adams					West Florida
483	var. obeliscus A. Adams					Vera Cruz
484	var. lamellosa Dunker					Florida Keys
	Genus OCINEBRA Leach.					
485	O. cellulosa Conrad	16	1	12.0	$\frac{0}{74}$	C. Lookout
486	var. levicula Dall				$\frac{88}{37}$	C. Lookout
487	O. intermedia C. B. Adams					Key West
	Genus MURICIDEA Swainson.					
488	M. hexagona Lamarck				25	Gulf of Mex.
489	M. multangula Philippi				$\frac{0}{95}$	Cape Fear
490	M. floridana Conrad				$\frac{0}{13}$	St. Augustine
491	M. Philippiana Dall				$\frac{0}{25}$	Key West
	Genus UROSALPINX Stimpson.					
492	U. cinereus Say	50	6	28.0	$\frac{0}{10}$	Nova Scotia
493	U. perrugatus Conrad					Cedar Keys

TABLE V. E.—*List of Gastropoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys	West. Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	*	*	*	*	*	*	*	....	....	....	Venezuela...	Pliocene.
....	..	*	..	....	....	*	*	....	....	....	....	Texas.....	P. Pliocene.
....	..	....	..	†	†	....	....	†	....	....	....	Guadalupe ..	
....	..	....	..	....	....	....	....	†	....	....	....	Martinique..	
....	..	†\	..	....	....	....	....	....	....	....	....	.....	
....	..	....	†	....	....	....	....	....	....	....	....	St.Augustine	
....	..	....	..	....	†	....	....	†	....	....	....	Cuba.....	
*	*	*	*	*	*	*	....	....	*	....	?	Charlotte H .	Pliocene.
....	..	....	†	....	....	....	....	†	....	....	....	Barbados....	
....	..	†	..	....	....	....	....	†	....	*†	....	St. Kitts	Pliocene.
†	..	†	..	....	....	....	....	....	....	....	....	Hatteras	
....	..	†	..	....	....	†	....	†	....	....	....	Dominica ...	
....	..	....	..	....	....	....	....	†	....	....	....	Barbados....	
....	..	*	..	....	....	....	....	....	....	....	....	Tropics.....	
....	..	....	..	....	....	....	....	....	....	*	....	Africa.....	
....	..	....	..	....	*	†	*	*	*	*	....	St. Thomas..	
....	..	....	..	....	....	....	*	*	....	....	....	St. Thomas..	
....	..	....	..	....	*	....	....	*	*	....	....	Cuba	
....	..	*	..	....	*	*	*	*	*	....	....	Sombrero ...	
....	..	*	..	....	*	*	....	*	....	....	....	Yucatan	
....	..	....	..	....	*	....	*	*	*	....	....	St. Thomas..	
....	..	....	..	....	*	....	*	*	....	*	....	St. Thomas..	Pliocene.
....	..	*	..	*	*	*	†*	*	....	....	....	Yucatan	Pliocene.
....	..	....	*	....	*	*	....	....	....	....	....	C.Romano...	
....	..	....	..	....	*	....	*	*	....	....	....	Yucatan	
*	*	*	*	....	....	*?	....	....	....	....	....	St.Augustine	Miocene.
....	..	....	..	....	*	*	....	....	....	....	....	Key West ...	Pliocene.

TABLE V. E.—*List of Gastropoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Subgenus **Phyllonotus** Swainson.					
467	P. pomum Gmelin	16	2	15.0	.....	Beaufort, N.C.
468	P. fulvescens Sowerby	....	.....	.....	.....	Hatteras ....
469	P. Pazi Crosse	15	1	32.0	3 3 0 / 3 3 8	Florida Str..
470	P. hystricinus Dall	16	4	21.0	1 4 4 / 2 5 4	Cuba.....
	Subgenus **Pteronotus** Swainson.					
471	P. macropterus Deshayes	....	.....	.....	63	Hatteras ....
472	P. phaneus Dall	42	1	17.0	2 8 4 / 4 3 1	Fernandina..
473	P. tristichus Dall	15	3	15.5	1 2 3 / 4 3 0	Florida Str..
	Genus EUPLEURA Adams.					
474	E. caudata Say	50	11	.....	1 / 2	Cape Cod....
475	E. Stimpsoni Dall	42	3	12.0	1 0 0 / 2 9 4	Fernandina..
	Genus TROPHON Montfort.					
	Subgenus **Boreotrophon** Fischer.					
476	B. vaginatus C. & J	....	.....	.....	843	N. Atlantic..
477	B. abyssorum Verrill	....	.....	8.0	8 4 3 / 2 0 3 3	Rhode Island
478	B. lacunellus Dall	15	4	41.0	3 2 7 / 7 6 9	Cape Fear...
479	*B. actinophorus* Dall	15	2	17.5	1 4 0 / 2 1 8	Santa Cruz .
	Subgenus **Aspella** Mörch.					
480	A. hastula Reeve	....	.....	.....	14	Cape Fear...
481	*A. scalarioides* Blainville	....	.....	.....	.....	Mediterran'n
482	var. paupercula C. B. Adams	....	.....	.....	.....	West Florida
483	var. obeliscus A. Adams	....	.....	.....	.....	Vera Cruz...
484	var. lamellosa Dunker	....	.....	.....	.....	Florida Keys
	Genus OCINEBRA Leach.					
485	O. cellulosa Conrad	16	1	12.0	0 / 1 4	C. Lookout..
486	var. levicula Dall	....	.....	.....	3 8 / 3 7	C. Lookout..
487	O. intermedia C. B. Adams	....	.....	.....	.....	Key West ...
	Genus MURICIDEA Swainson.					
488	M. hexagona Lamarck	....	.....	.....	25	Gulf of Mex.
489	M. multangula Philippi	....	.....	.....	0 / 9 8	Cape Fear...
490	M. floridana Conrad	....	.....	.....	0 / 1 3	St. Augustine
491	M. Philippiana Dall	....	.....	.....	0 / 7 3	Key West ...
	Genus UROSALPINX Stimpson.					
492	U. cinereus Say	50	6	28.0	0 / 1 0	Nova Scotia.
493	U. perrugatus Conrad	....	.....	.....	.....	Cedar Keys.

TABLE V. E.—*List of Gastropoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys	West. Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	*	*	*	*	*	*	*	....	....	....	Venezuela...	Pliocene.
....	..	*	..	....	....	*	*	....	....	....	....	Texas	P. Pliocene.
....	..	....	..	†	†	....	....	†	....	....	....	Guadalupe ..	
....	..	....	..	....	....	....	....	†	....	....	....	Martinique..	
....	..	†\	..	....	....	....	....	....	....	....	....	.....	
....	..	....	†	....	....	....	....	....	....	....	....	St.Augustine	
....	..	....	..	....	†	....	....	†	....	....	....	Cuba.....	
*	*	*	*	*	*	*	....	....	*	....	†	Charlotte H .	Pliocene.
....	..	....	†	....	....	....	....	†	....	....	....	Barbados....	
....	..	†	..	....	....	....	....	†	....	*†	....	St. Kitts	Pliocene.
†	..	†	..	....	....	....	....	....	....	....	....	Hatteras	
....	..	†	..	....	....	†	....	†	....	....	....	Dominica ...	
....	..	....	..	....	....	....	....	†	....	....	....	Barbados....	
....	..	*	..	....	....	....	....	....	....	....	....	Tropics.....	
....	..	....	..	....	....	....	....	....	....	*	....	Africa.....	
....	..	....	..	....	*	†	*	*	*	*	....	St. Thomas..	
....	..	....	..	....	....	....	*	*	....	....	....	St. Thomas..	
....	..	....	..	....	*	....	....	*	*	....	....	Cuba	
....	..	*	..	....	*	*	*	*	*	....	....	Sombrero ...	
....	..	*	..	....	*	*	....	*	....	....	....	Yucatan	
....	..	....	..	....	*	....	*	*	*	....	....	St. Thomas..	
....	..	....	..	....	*	....	*	*	....	*	....	St. Thomas..	Pliocene.
....	..	*	..	*	*	*	†*	*	....	....	....	Yucatan	Pliocene.
....	..	....	*	....	*	*	....	....	....	....	....	C.Romano...	
....	..	....	..	....	*	....	*	*	....	....	....	Yucatan	
*	*	*	*	....	....	*?	....	....	....	....	....	St.Augustine	Miocene.
....	..	....	..	....	*	*	....	....	....	....	....	Key West ...	Pliocene.

TABLE V. E.—*List of Gastropoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
494	Urosalpinx tampaensis Conrad	....	.....	.....	.....	Cedar Keys.
495	U. ? carolinensis Verrill	....	.....	15.0	$\frac{130}{935}$	Hatteras ....
496	U. ? macra Verrill	....	.....	13.0	$\frac{85}{375}$	Hatteras ....
	Genus TYPHIS Montfort.					
497	T. longicornis Dall	15 38	7 5	15.0 23.0	$\frac{137}{455}$	Gulf of Mex.
	Subfamily *Purpurinæ*.					
	Genus PURPURA Bruguière.					
498	P. patula Linné	....	.....	.....	.....	Jupiter Inlet.
499	*P. lapillus* Linné	50	1, 2, 3	.....	.....	Norway .....
500	P. hæmastoma Linné	34 46	3, 4 1*a*–2*b*	50.0	.....	Hatteras ....
501	P. deltoidea Lamarck	....	.....	.....	.....	Jupiter Inlet.
	Genus SISTRUM Montfort.					
502	S. roseum Reeve	....	.....	.....	.....	Gulf of Mex.
503	S. nodulosum C. B. Adams	....	.....	.....	.....	C. Romano ..
	Subfamily *Coralliophilinæ*.					
	Genus CORALLIOPHILA Adams.					
504	C. Deburghiæ Reeve	16 44	5 1	20.0 27.0	$\frac{56}{575}$	Hatteras ....
505	C. abbreviata Lamarck	....	.....	.....	$\frac{15}{100}$	Cape Fear...
506	C. bracteata Brocchi	....	.....	.....	$\frac{9}{30}$	Hatteras ....
507	C. lactuca Dall	16	6	11.0	$\frac{128}{332}$	Fernandina .
	Suborder STREPTODONTA.					
	Superfamily PTENOGLOSSA.					
	Genus SCALA Humphrey.					
508	S. angulata Say	....	.....	.....	.....	Connecticut.
509	S. Sayana Dall	50	10	.....	.....	Virginia ....
510	S. tenuis Sowerby	....	.....	.....	.....	Gulf of Mex.
511	S. eburnea Potiez & Michaud	....	.....	.....	.....	Hatteras ....
512	S. centiquadra Mörch	....	.....	.....	.....	Hatteras ....
513	S. muscapedia Dall	....	.....	17.5	15	Cape Fear...
514	S. apiculata Dall	....	.....	5.0	$\frac{17}{30}$	Hatteras ....
515	S. multistriata Say	50	5	.....	.....	Cape Cod ...
516	S. Pourtalesii Verrill & Smith	61	92	17.5	$\frac{75}{375}$	Rhode Island
517	*S. contorquata* Dall	18	9	4.7	161	.....
518	S. ———	....	.....	.....	56	Florida Str..

TABLE V. E.—*List of Gastropoda*—Continued.

N.J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermudas.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	....	..	....	....	*	....	....	....	....	....	Sarasota	
....	..	†	..	....	*†	....	....	....	....	....	....	Key West ...	
....	..	†	..	....	†	....	....	....	....	....	....	Cape Florida	
....	..	....	..	....	†	....	....	†	....	....	....	Cuba.....	
....	..	....	..	*	*	*	*	*	*	....	*	Brazil	
*	..	....	..	....	....	....	....	....	....	*	....	New York...	Pliocene.
....	..	*	*	*	*	....	*	*	*	....	....	Trinidad	
....	..	....	..	*	*	*	*	*	*	*	....	St. Vincent .	
....	..	....	..	....	....	....	*	*	....	....	....	Barbados	
....	..	....	..	....	*	*	....	*	....	....	....	Aspinwall ...	
....	..	†	..	....	†	†	....	†	....	....	....	Barbados....	Miocene.
....	..	*	..	....	*	*	....	*†	....	*	....	Tropics	Pliocene.
....	..	*	..	....	*	....	....	....	....	....	....	Key West ...	
....	..	....	†	....	†	....	....	†	....	....	....	Cuba.....	
*	*	*	*	....	*	*	*	....	*	*	....	Texas.....	
....	*	*	..	....	*	*	*	....	....	....	....	Key West ...	
....	..	....	..	....	*	....	*	*	*	....	....	St. Thomas..	
....	..	†	..	....	*	....	....	*	*	....	....	Barbados....	
....	..	†	..	....	....	....	....	*	....	....	....	Yucatan.....	
....	..	*	..	....	....	....	....	....	....	....	....	.....	
....	..	*	..	....	....	....	....	....	....	....	....	Cape Fear...	
*	..	*	..	....	....	....	....	....	....	....	....	S. Carolina..	Pliocene.
†	..	....	..	....	....	....	....	†	....	....	....	Sombrero....	
....	..	....	..	....	....	....	....	†	....	....	....	Grenada.....	
....	..	....	..	†	....	....	....	*	....	....	....	Rum Cay....	

TABLE V. E.—*List of Gastropoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
519	Scala Dunkeriana Dall	....	.....	.....	.....	Turtle Harb.
520	S. nitidella Dall	....	.....	13.5	33/63	Hatteras ....
521	S. ———	....	.....	.....	8	Cape Florida
522	S. Frielei Dall	....	.....	4.75	63/107	Hatteras ....
523	S. *sericifila* Dall	....	.....	5.1	.....	Gulf of Mex.
524	S. Rushii Dall	....	.....	.....	0/63	Hatteras ....
525	S. clathratula Adams	....	.....	.....	40/146	Rhode Island
526	S. novemcostata Mörch	....	.....	.....	1/30	Hatteras ....
527	S. babylonia Dall	42	8	30.0	731	Cape Fear...
528	S. ———	....	.....	.....	940	Cedar Keys..
529	S. formosissima Jeffreys	18	11	8.0	339	N. Atlantic..
530	S. permodesta Dall	....	.....	.....	.....	C. Lookout..
531	S. scipio Dall	....	.....	16.0	1/30	Hatteras ....
532	S. polacia Dall	18	10	7.25	229	Florida Str..
533	S. Dalliana Verrill & Smith	61	91	10.5	88/192	Rhode Island
534	S. teres Bush	41	8	4.0	1/8	Hatteras ....
535	S. erectispina Mörch	....	.....	.....	5/168	Hatteras ....
536	S. turricula Sowerby	....	.....	.....	10/12	Hatteras ....
537	S. grœnlandica Perry	61 72	90) 10)	.....	.....	Arctic Sea...
538	S. denticulata Sowerby	....	.....	.....	.....	Hatteras ....
539	S. pernobilis Fischer & Bernardi	....	.....	38.0	187/305	Hatteras ....
540	*S. belaurita* Dall	18	11*b*	8.3	73	.....
541	S. clathrus Linné	....	.....	.....	.....	Bahamas ....
542	S. Krebsii Mörch	....	.....	.....	.....	Tortugas ....
543	S. Candeana Orbigny	....	.....	.....	.....	Tortugas ....
544	S. Blandii Mörch	....	.....	.....	.....	Tortugas ....
545	S. lineata Say	....	.....	.....	.....	Cape Cod....
	Section ACRILLA Adams.					
546	S. retifera Dall	....	.....	.....	19/63	Hatteras ....
	Section CIRSOTREMA Mörch.					
547	S. cochlea Sowerby	....	.....	.....	88/174	Hatteras ....
	Subgenus **Opalia** Adams.					
548	O. crenata var. Hotessieriana Orbigny	....	.....	.....	.....	Tortugas ....
549	O. hellenica Forbes	18	1	6.9	8/30	Hatteras ....
550	*O. aurifila* Dall	18	4	11.0	270	.....
551	*O. Leeana* Verrill	61	93	.....	146	Rhode Island
552	O. concava Dall	....	.....	14.0	1/94	Fernandina.
553	O. discobolaria Dall	18	2	6.5	220/294	Fernandina.

TABLE V. E.—*List of Gastropoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	....	..	....	*	....	....	*	....	....	....	Haiti	
....	..	†	..	....	....	*	....	....	....	....	....	Cedar Keys..	
....	..	....	..	....	*	....	....	....	....	....	....	.....	
....	..	†	..	....	....	....	....	....	....	....	....	.....	
....	..	....	..	....	....	....	?	*	....	....	....	Honduras ...	
....	..	†	..	....	....	....	....	*	....	....	....	Haiti	
†	..	†	..	....	....	....	....	....	....	....	....	Hatteras	
....	..	†*	..	....	....	....	....	*	....	....	....	St. Thomas ..	
....	..	†	..	....	....	....	....	....	....	....	....	.....	
....	..	....	..	....	....	†	....	....	....	....	....	.....	
....	..	....	..	....	†	....	....	....	....	....	....	Florida Keys	
....	..	†	..	....	....	....	....	*	....	....	....	Jamaica....	
....	..	*	..	....	....	....	*	....	....	....	....	Vera Cruz...	
....	..	....	..	....	†	....	....	†	....	....	....	Cuba.....	
†	..	†	..	....	....	....	....	....	....	....	....	Cape Fear...	
....	..	*	..	....	....	....	....	....	....	....	....	.....	
....	..	†	..	....	....	....	....	*	....	....	....	St. Thomas..	
....	..	*	*	....	....	....	....	*	....	....	....	Haiti	
?	..	?*	..	....	....	....	....	....	....	*	*	Rhode Isl'd?.	Pliocene.
....	..	†	..	....	....	*	....	*	....	....	....	Bahamas	
....	..	†	..	....	....	....	....	†	....	....	....	Guadalupe ..	
....	..	....	..	....	....	....	....	†	....	....	....	Barbados....	
....	..	....	..	....	?	....	....	*	*	....	....	Barbados....	
....	..	....	..	....	*	....	....	*	....	....	....	Sombrero ...	
....	..	....	..	....	*	....	....	*	....	....	....	Cuba.....	
....	..	....	..	....	*	....	....	*	....	....	....	St. Thomas..	
*	*	*	..	....	....	*	....	....	....	....	....	Charlotte H .	Pliocene.
....	..	†	†	†	....	....	....	....	....	....	....	Florida Str..	
....	..	†	..	....	....	*	....	*	....	....	....	Santa Cruz..	
....	..	....	..	....	*	....	....	*	....	....	....	Guadalupe ..	
....	..	†	..	....	*	....	....	*	....	*	....	Haiti	
....	..	....	..	....	....	....	....	†	....	....	....	Martinique ..	
†?	..	....	..	....	....	....	....	....	....	....	....	.....	
....	..	....	..	....	*	....	....	....	....	....	....	Florida Str..	
....	..	....	†	....	†	....	....	†	....	....	....	Cuba.....	

TABLE V. E.—*List of Gastropoda*—Continued.

Ref. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Genus ACLIS Lovèn.					
554	A. lata Dall	18	8	5.5	100/294	Fernandina.
555	A. egregia Dall	18	12	13.0	284/484	Fernandina.
556	A. nucleata Dall	18	7	9.3	284/484	Fernandina.
557	A. tennis Verrill	....	.....	3.8	63/1763	George's B'ks
558	A. striata Verrill	....	.....	4.0	63/100	B. of Fundy.
559	A. ———	....	.....	.....	284/780	Fernandina.
560	A. ———	....	.....	.....	284/780	Fernandina.
561	A. ———	....	.....	.....	294	Fernandina.
	Family JANTHINIDÆ.					
	Genus JANTHINA Lamarck.					
562	J. communis Lamarck	....	.....	.....	Pelagic	Nantucket ..
563	J. globosa Swainson	....	.....	.....	Pelagic	Gulf Stream.
564	J. prolongata Blainville	....	.....	.....	Pelagic	N. Atlantic ..
565	J. exigua Lamarck	....	.....	.....	Pelagic	Gulf Stream.
	Superfamily GYMNOGLOSSA.					
	Family EULIMIDÆ.					
	Genus EULIMA Risso.					
566	E. conoidea Kurtz & Stimpson	....	.....	.....	.....	Hatteras ....
567	E. gracilis C. B. Adams	....	.....	.....	.....	Hatteras ....
568	E. intermedia Cantraine	52	14	.....	11/645	Norway .....
569	E. jamaicensis C. B. Adams	....	.....	.....	.....	Cedar Keys..
570	E. subcarinata Orbigny	....	.....	.....	.....	Hatteras ....
571	E. Carolli Dall	....	.....	.....	.....	Hatteras ....
	Section MELANELLA Bowdich.					
572	E. arcuata C. B. Adams	19	11	4.0	.....	Fernandina.
573	E. elongata Dautzenberg	....	.....	.....	.....	Norway .....
574	E. gibba De Folin	....	.....	.....	.....	Hatteras ....
	Subgenus **Liostraca** Adams.					
575	L. bilineata Alder	....	.....	.....	.....	Norway .....
576	L. acuta Sowerby	....	.....	.....	12/100	C. Lookout..
577	L. stenostoma Jeffreys	....	.....	.....	10/1002	Norway .....
578	L. fusus Dall	19	11*d*	13.3	274/840	Fernandina.
579	L. Hemphillii Dall	48	11	3.0	.....	Cedar Keys..
	Genus STILIFER Broderip.					
580	S. Stimpsoni Verrill	....	.....	.....	6/1235	George's B'ks

TABLE V. E.—*List of Gastropoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	....	†	....	....	....	....	†	....	....	....	Barbados....	
....	..	....	†	....	....	....	....	†	....	....	....	Guadalupe ..	P. Pliocene.
....	..	....	†	....	....	....	....	†	....	....	....	St. Vincent..	P. Pliocene.
†	..	*†	..	†	....	....	....	†	....	....	....	Florida Str..	
†	..	†	..	....	....	....	....	....	....	....	....	Hatteras	
....	..	....	†	†	....	....	....	†	....	....	....	Florida Str..	
....	..	....	†	†	....	....	....	†	....	....	....	Florida Str..	
....	..	....	†	....	....	....	....	....	....	....	....	.....	
*	*	*	*	*	*	*	*	*	*	*	....	Aspinwall...	
....	..	....	*	*	*	*		*	*	*	....	.....	
....	..	....	..	?	....	....	....	*	*	....	....	.....	
....	..	....	..	....	*	....	....	*	....	....	*	Barbados....	
....	..	*	*	....	*	*	....	*	....	....	....	West Indies .	Pliocene.
....	..	*	..	....	*	*	*	*	....	....	....	St. Thomas..	
†	†	*†	..	....	*	*	....	*†	....	†*	....	Barbados....	
....	..	....	..	....	....	*	....	*	....	....	....	Haiti	
....	..	*	..	....	*	*	....	*	....	....	....	Haiti	
....	..	*	..	....	*	....	....	*	....	....	....	Jamaica.....	Pliocene.
....	..	†	..	....	?	....	....	†	....	*	....	.....	
....	..	*	..	....	*	....	....	*	....	*	....	Barbados....	
....	..	†	..	....	....	....	†	....	....	*	*	Campeche...	
....	..	†*	..	....	†	*	....	†	....	*	....	Haiti	
....	..	*	..	....	....	....	....	*	....	....	*	Barbados....	
....	..	†?	†	....	....	....	....	....	....	*†	....	Fernandina .	
....	..	....	†	....	....	....	†	†	....	....	....	St. Kitts	
....	..	....	..	....	*	*	....	....	....	....	....	Marco.....	
*	..	*?	..	....	*	....	....	....	....	....	....	Fla. Keys ?..	

TABLE V. E.—*List of Gastropoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Genus NISO Risso.					
581	N. splendidula Sowerby			27.0	15/111	Cape Fear...
582	N. interrupta Sowerby	18	5,6	20.0	11/44	Florida Str..
583	var. *albida* Dall	18	5	8.1	116	
584	var. tricolor Dall				15/107	Hatteras ....
585	var. æglees Bush	41	10, *a*	7.5	7/32	Hatteras ....
586	var. *circinata* Dall					
	Family PYRAMIDELLIDÆ.					
	Genus PYRAMIDELLA Lamarck.					
	Section LONGCHÆUS Mörch.					
587	P. crenulata Holmes					S. Carolina..
588	P. candida Mörch					Hatteras ....
	Section PYRAMIDELLA s. s.					
589	P. dolabrata Linné					Sarasota ....
	Genus TURBONILLA Leach.					
590	T. lævis C. B. Adams				15/107	Hatteras ....
591	T. ——					Estella Pass.
592	T. ——				12/80	Cape Fear...
593	T. puncta C. B. Adams				12/5	Hatteras ....
594	T. exilis C. B. Adams				3/65	Hatteras ....
595	T. Bushiana Verrill			12.0	365/1467	Rhode Island
596	*T. Rathbuni* Verrill and Smith	63	104		64/1395	Rhode Island
597	T. pusilla C. B. Adams				16/294	Hatteras ....
598	T. ——				31/124	Hatteras ....
599	T. ——					Hatteras ....
600	T. perlepida Verrill			7.0	70	Chesapeake .
601	T. ——				63/104	Hatteras ....
602	T. grandis Verrill			18.0	1582	Maryland ...
603	T. helotheca Dall	26	7*d*	14.0	49/69	Florida Str..
604	T. interrupta Totten	26	2, 2*b*	11.0	3/107	Nova Scotia .
605	T. ? elegans Verrill	52	6			Mass. Bay ...
606	T. reticulata C. B. Adams					Hatteras ....
607	T. multicostata C. B. Adams					S. Carolina ..
608	T. obeliscus C. B. Adams				12/63	Hatteras ....
609	T. virga Dall			8.1	2/15	Hatteras ....
610	T. punicea Dall			8.0	8/21	C. Lookout..
611	T. subulata C. B. Adams				1/63	Hatteras ....
612	T. ——				14/63	Hatteras ....
613	T. curta Dall	26	7*c*	8.3	15/640	Hatteras ....

TABLE V. E.—*List of Gastropoda*—Continued.

N.J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Ber. mu. da.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	*	..	....	....	†	....	....	....	....	*	New Grenada	
....	..	....	..	....	†	....	....	....	....	....	*	Centr. Am..	
....	..	....	..	....	....	....	....	*	....	....	....	St. Lucia	
....	..	†*	..	....	....	....	....	....	....	.. .	....	N. Carolina..	
....	..	*	..	...	....	*	....	....	....	....	....	Tampa	
....	..	....	..	....	....	....	....	*	....	....	....	Barbados...	
....	..	*	..	....	*	*	....	*	....	....	....	St. Thomas ..	Pliocene.
....	..	*	*	....	*	*	....	*	....	....	....	Barbados....	
....	..	....	..	....	*	*	....	*	....	....	....	Barbados....	P. Pliocene.
....	..	†*	..	....	....	....	....	*	....	....	....	Jamaica.....	
....	..	....	..	*	....	....	....	*	....	....	....	Honduras ...	
....	..	†*	..	....	....	*	....	....	....	....	....	Charlotte H.	
....	..	*	..	..	....	....	....	*	....	....	....	Haiti.....	
....	..	†*	..	....	*	*	....	*	....	....	....	Haiti.....	
††	..	....	..	....	....	....	....	†	....	?	....	Old Provid'ce	
††	..	....	..	....	....	....	....	....	....	....	....	.....	
....	..	*	*	....	....	....	....	*	....	....	....	Barbados....	
....	..	†	..	....	....	....	....	....	....	....	....	.....	
....	..	*	..	....	*	*	....	....	....	....	....	Charlotte H.	
†	..	....	..	....	....	....	....	....	....	....	....	.....	
....	..	†	..	....	....	....	....	....	....	....	....	.....	
†	..	....	..	....	....	....	....	....	....	....	....	.....	
....	..	....	..	....	†	†	....	†	....	....	....	Barbados....	
....	..	††	..	....	*	*	....	†	....	*	....	Barbados....	P. Pliocene.
....	*	*	..	*	....	....	....	....	....	....	....	East Florida.	
....	..	†*	..	....	....	....	....	*	....	....	....	Jamaica.....	
....	..	*	..	....	*	....	....	*	....	....	....	Jamaica.....	
....	..	*	..	....	*	*	....	*	....	....	....	St. Thomas ..	
....	..	*	..	...	*	*	....	....	....	....	....	Key West ...	
....	..	*	*	....	....	*	....	*	....	....	....	Bahamas	
....	..	†*	..	....	*	....	....	*	....	....	....	Haiti	
....	..	†*	..	....	....	....	....	*	....	....	....	Haiti	
....	..	†*	..	....	....	....	†	†	....	....	....	Yucatan.....	

TABLE V. E.—*List of Gastropoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Subgenus Parthenia Lowe.					
614	P. cedrosa Dall	48	4	5.5	.....	Cedar Keys..
	Subgenus Stylopsis A. Adams.					
615	S. resticula Dall	....	.....	3.5	.....	Gulf of Mex.
	Subgenus ? Careliopsis Mörch.					
616	C. styliformis Mörch	....	.....	.....	$\frac{2}{5}\frac{0}{7}$	Hatteras ....
	Genus EULIMELLA Forbes.					
617	E. unifasciata Forbes	19	11c	6.0	$\frac{6}{1}\frac{0}{7}\frac{0}{0}$	Britain.....
618	E. ———	....	.....	.....	$\frac{1}{1}\frac{0}{2}\frac{7}{4}$	Hatteras ....
619	E. ———	....	.....	.....	$\frac{1}{1}\frac{0}{0}\frac{3}{7}$	Hatteras ....
620	E. ———	....	.....	.....	168	C. Lookout..
621	E. scillæ Scacchi	....	.....	.....	$\frac{6}{6}\frac{0}{7}$	Norway.....
622	E. lissa Verrill	....	.....	6.0	142	Hatteras ....
	Genus PERISTICHIA Dall.					
623	P. toreta Dall	42	10	10.8	$\frac{2}{1}\frac{0}{7}$	C. Lookout..
624	P. agria Dall	....	.....	6.0	$\frac{2}{6}\frac{0}{3}$	Hatteras ....
	Genus OSCILLA Adams.					
625	O. nivea Mörch	48	2	8.4	.....	Key West ...
	Genus SYRNOLA A. Adams.					
626	S. ———	....	.....	.....	205	Cape Fear...
627	S. producta C. B. Adams	52	13	.....	.....	Mass. Bay ...
628	S. fusca C. B. Adams	52	15	.....	.....	Cape Cod....
	Genus ODOSTOMIA Fleming.					
629	O. unidentata Montagu	....	.....	.....	$\frac{6}{1}\frac{3}{0}\frac{3}{0}$	Norway.....
630	O. engonia Bush	....	.....	5.0	$\frac{1}{1}\frac{6}{0}\frac{6}{0}$	Hatteras ....
631	O. tornata Verrill	....	.....	3.0	$\frac{1}{1}\frac{0}{4}\frac{2}{2}$	Hatteras ....
632	O. acutidens Dall	....	.....	4.2	$\frac{3}{1}\frac{0}{0}\frac{7}{7}$	Hatteras ....
633	O. desparilis Verrill	....	.....	3.2	142	Hatteras ....
634	O. teres Bush	41	9	4.5	$\frac{1}{1}\frac{4}{2}$	Hatteras ....
635	O. trifida Totten	52	8	.....	.....	Mass. Bay ...
636	O. bisuturalis Say	52	7	.....	.....	Mass. Bay ...
637	O. impressa Say	52	11	.....	$\frac{2}{5}$	Mass. Bay ...
638	O. seminuda C. B. Adams	52	10	.....	.....	Mass. Bay ...
639	O. ———	....	.....	.....	.....	Texas.....

TABLE V. E.—*List of Gastropoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	....	..	....	....	*	....	....	....	....	....	Gulf of Mex .	
....	..	....	..	....	*	....	....	....	....	....	....	Key West ...	
....	..	†*	..	....	....	*	....	*	....	....	....	St. Thomas ..	
....	..	†	†	....	....	†	....	....	....	....	....	Barbados....	
....	..	†	..	....	....	....	....	....	....	....	....	.....	
....	..	*	..	....	....	....	....	....	....	....	....	.....	
....	..	*	..	....	....	....	....	....	....	....	....	.....	
....	..	†	..	....	*	....	....	*	....	....	....	West Indies .	
....	..	†	..	....	....	....	....	....	....	....	....	.....	
....	..	*	..	....	*	*	....	....	....	....	....	Key West ...	
....	..	†	..	....	*	....	....	....	....	....	....	Key West ...	
....	..	....	..	....	*	....	....	*	....	....	....	Martinique ..	
....	..	*	..	*	*	....	....	*	....	....	....	Haiti.....	
*	..	....	..	....	....	....	....	....	....	....	....	Delaware ? ..	
*	..	....	..	....	....	....	....	....	....	....	....	Delaware ? ..	
....	..	†	..	†	....	....	....	....	....	....	....	East Florida.	
....	..	*†	..	†	....	....	....	....	....	....	....	East Florida.	
....	..	*†	..	....	....	....	....	....	....	....	....	Cape Fear...	
....	..	†*	..	†	....	*	....	....	....	....	....	West Florida.	
....	..	†	..	....	....	....	....	....	....	....	....	.....	
....	..	*	..	....	....	....	....	....	....	....	....	.....	
*	..	....	..	....	....	....	....	....	....	....	....	New Jersey..	
*	..	....	..	....	....	....	....	....	....	....	....	Delaware B..	
*	*	*	*	*	....	*	....	....	....	....	....	Tampa	
*	..	*	..	*	*	*	....	....	....	....	....	Florida Keys.	
....	..	....	..	*	....	....	*	....	....	....	....	Key West ...	

TABLE V. E.—*List of Gastropoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Superfamily TÆNIOGLOSSA.					
	Family TRITONIIDÆ.					
	Genus DISTORTRIX Link.					
640	D. reticulata Link	....	.....	.....	$\frac{23}{154}$	Hatteras ....
	Genus GYRINEUM Link.					
641	G. affine Broderip	....	.....	.....	.....	Hatteras ....
	Genus TRITONIUM Link.					
642	T. tritonis L. var. nobilis Conrad	....	.....	.....	121	Key West ...
	Subgenus **Colubraria** Schumacher.					
643	C. testacea Mörch	....	.....	.....	.....	Hatteras ....
644	C. lanceolata Menke	....	.....	.....	.....	Hatteras ....
645	*C. Swiftii* Tryon	....	.....	.....	.....	Bermuda ....
646	*C. reticulata* Blainville	....	.....	....	.....	Nassau .....
	Subgenus **Ranularia** Schumacher.					
647	R. tuberosa Lamarck	....	.....	.....	.....	Key West ...
	Subgenus **Lampusia** Schumacher.					
648	L. chlorostoma Lamarck	....	.....	.....	.....	Jupiter Inlet.
649	L. pileare Lamarck	....	.....	.....	.....	Key West ...
650	L. gracile Reeve	29	2	25.5	$\frac{34}{100}$	Gulf of Mex .
651	*L. pharcida* Dall	36	2	23.6	82	Antilles ?....
652	L. labiosa Wood	....	.....	.....	$\frac{1}{4}\frac{1}{3}$	Hatteras ....
653	L. olearium Linnæus	....	.....	.....	.....	Hatteras ....
654	L. cynocephala Lamarck	....	.....	.....	.....	Florida Str..
	Subgenus **Lotorium** Montfort.					
655	L. femorale Linné	....	.....	.....	.....	Cedar Keys..
	Family OÖCORITIDÆ.					
	Genus Oöcorys Fischer.					
656	O. abyssorum Verrill & Smith	....	.....	.....	$\frac{169}{1111}$	Chesapeake .
657	O. sulcata Fischer	62	83	.....	.....	Hatteras ?...
	Family ——?.					
	Genus DALIUM Dall.					
658	*D. solidum* Dall	19	10*d*	41.0	576	Grenada ....

TABLE V. E.—*List of Gastropoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	†*	..	....	*	*	....	....	....	....	....	Barbados....	
....	..	†	..	....	†	....	†	†	....	....	†	Tropics	
....	..	....	..	....	†	....	....	†	*	?	....	Barbados....	
....	..	†	..	....	*	....	*	†	....	....	....	Sombrero....	Pliocene.
....	..	†	..	....	*	....	†	*	*	....	....	Barbados....	
....	..	....	..	?	....	....	....	†	*	....	....	Barbados....	
....	..	....	..	?	....	....	....	*	....	*	....	Haiti	
....	..	....	..	....	*	....	....	*	*	....	*	Tropics.....	
....	..	....	..	*	*	....	*	†	*	....	....	Barbados....	
....	..	....	..	...	*	....	....	*	*	....	....	Trinidad	
....	..	....	..	....	....	*	....	†	....	....	....	Aspinwall ...	
....	..	....	..	....	....	....	....	†	....	....	....	Barbados....	
....	..	*	..	....	....	....	....	*	....	*	....	Tropics.....	
....	..	†	..	....	....	....	*	*	....	....	....	Carthagena .	
....	..	....	..	....	*	....	*	*	....	....	....	Margarita Id.	
....	..	....	..	*	*	*	....	*	*	....	....	Guadalupe ..	
....	†	†	..	....	....	†	....	....	....	....	....	Cedar Keys..	
....	..	†	..	....	....	....	....	†	....	†	....	Africa.....	
....	..	....	..	....	....	....	....	†	....	....	....	.....	

TABLE V. E.—*List of Gastropoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Superfamily TÆNIOGLOSSA.					
	Family TRITONIIDÆ.					
	Genus DISTORTRIX Link.					
640	D. reticulata Link	....	.....	.....	$\frac{23}{154}$	Hatteras ....
	Genus GYRINEUM Link.					
641	G. affine Broderip	....	.....	.....	.....	Hatteras ....
	Genus TRITONIUM Link.					
642	T. tritonis L. var. nobilis Conrad	....	.....	.....	121	Key West ...
	Subgenus **Colubraria** Schumacher.					
643	C. testacea Mörch	....	.....	.....	.....	Hatteras ....
644	C. lanceolata Menke	....	.....	.....	.....	Hatteras ....
645	*C. Swiftii* Tryon	....	.....	.....	.....	Bermuda ....
646	*C. reticulata* Blainville	....	.....	.....	.....	Nassau .....
	Subgenus **Ranularia** Schumacher.					
647	R. tuberosa Lamarck	....	.....	.....	.....	Key West ...
	Subgenus **Lampusia** Schumacher.					
648	L. chlorostoma Lamarck	....	.....	.....	.....	Jupiter Inlet.
649	L. pileare Lamarck	....	.....	.....	.....	Key West ...
650	L. gracile Reeve	29	2	25.5	$\frac{34}{100}$	Gulf of Mex.
651	*L. pharcida* Dall	36	2	23.6	82	Antilles ?....
652	L. labiosa Wood	....	.....	.....	$\frac{11}{43}$	Hatteras ....
653	L. olearium Linnæus	....	.....	.....	.....	Hatteras ....
654	L. cynocephala Lamarck	....	.....	.....	.....	Florida Str..
	Subgenus **Lotorium** Montfort.					
655	L. femorale Linné	....	.....	.....	.....	Cedar Keys..
	Family OÖCORITIDÆ.					
	Genus Oöcorys Fischer.					
656	O. abyssorum Verrill & Smith	....	.....	.....	$\frac{169}{1111}$	Chesapeake .
657	O. sulcata Fischer	62	83	.....	.....	Hatteras ?...
	Family ——?.					
	Genus DALIUM Dall.					
58	*D. solidum* Dall	19	10*d*	41.0	576	Grenada ....

TABLE V. E.—*List of Gastropoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Ber-mu-da.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	†*	..	....	*	*	....	....	....	....	....	Barbados....	
....	..	†	..	....	†	....	†	†	....	....	†	Tropics	
....	..	....	..	....	†	....	....	†	*	?	....	Barbados....	
....	..	†	..	....	*	....	*	†	....	....	....	Sombrero....	Pliocene.
....	..	†	..	....	*	....	†	*	*	....	....	Barbados....	
....	..	....	..	?	....	....	....	†	*	....	....	Barbados....	
....	..	....	..	?	....	....	....	*	....	*	....	Haiti.....	
....	..	....	..	....	*	....	....	*	*	....	*	Tropics.....	
....	..	....	..	*	*	....	*	†	*	....	....	Barbados....	
....	..	....	..	...	*	....	....	*	*	....	....	Trinidad	
....	..	....	..	....	....	*	....	†	....	....	....	Aspinwall ...	
....	..	....	..	....	....	....	....	†	....	....	....	Barbados....	
....	..	*	..	....	....	....	....	*	....	*	....	Tropics.....	
....	..	†	..	....	....	....	*	*	....	....	....	Carthagena .	
....	..	....	..	....	*	....	*	*	....	....	....	Margarita Id.	
....	..	....	..	*	*	*	....	*	*	....	....	Guadalupe ..	
....	†	†	..	....	....	†	....	....	....	....	....	Cedar Keys..	
....	..	†	..	....	....	....	....	†	....	†	....	Africa.....	
....	..	....	..	....	....	....	....	†	....	....	....	.....	

TABLE V. E.—*List of Gastropoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Family CASSIDIDÆ.					
	Genus CASSIS Lamarck.					
659	C. cameo Stimpson					Hatteras
660	C. tuberosa Linné					Hatteras
661	C. testiculus Linné					Hatteras
662	C. inflata Shaw					Hatteras
	Genus GALEODEA Link.					
663	G. Coronadoi Crosse				124	Cape Fear
	Genus LAMBIDIUM Link.					
664	L. oniscus Linné					Tortugas
	Genus ONISCIDIA Swainson.					
65	O. Dennisoni Reeve				130	Gulf of Mex.
	Genus SCONSIA Gray.					
666	S. striata Lamarck				85	Cape Florida.
	Family DOLIIDÆ.					
	Genus DOLIUM Lamarck.					
667	D. galea Linné					Hatteras
668	D. perdix Linné					Florida Keys.
	Subgenus **Eudolium** Dall.					
669	E. Crosseanum Monterosato	15 44 62	5 2a–b 83, a	35.0	$\frac{88}{407}$	Rhode Island
670	*E. Verrillii* Dall	35	12	32.0	73	Grenada.
	Genus PYRULA Lamarck.					
671	P. papyratia Say					N. Carolina.
	Family AMPHIPERASIDÆ.					
	Genus AMPHIPERAS Gronovius.					
	Subgenus **Simnia** Risso.					
672	S. acicularis Lamarck					Cape Fear
673	S. intermedia Sowerby				$\frac{13}{170}$	Hatteras
674	S. uniplicata Sowerby				$\frac{13}{121}$	N. Carolina.
675	S. aureocincta Dall			18.5	$\frac{98}{78}$	Florida Str.
	Genus ULTIMUS Montfort.					
676	U. gibbosus Linné				$\frac{16}{80}$	Hatteras
	Genus PEDICULARIA Swainson.					
	', decussata Gould	19	9*a*, *b*	6.0	$\frac{188}{188}$	Georgia

TABLE V. E.—*List of Gastropoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extr me range.	Range in time.
....	..	*	*	....	*	*	....	*	..	....	....	Barbados....	
....	..	*	*	....	....	*	....	*	....	....	....	Barbados....	
....	..	*	..	....	*	....	*	*	*	....	....	Trinidad	
....	..	†*	..	†	†	†	*	*†	....	....	....	Brazil.....	
....	..	†	..	....	....	....	....	†*†	....	....	....	Matanzas ...	
....	..	....	..	†	*	....	....	*	....	....	....	Trinidad	
....	..	....	..	....	....	....	†	†	....	....	....	Guadalupe ..	
....	..	....	..	....	†	....	....	†	....	E. I.	....	Barbados....	
....	..	*	..	....	*	*	*	*	....	....	....	Trinidad	
....	..	....	..	....	*	*	....	*	*	....	....	Brazil.....	
....	†	†	†	....	†	....	....	†	....	†	....	Barbados....	
....	..	....	..	....	....	....	....	†	....	....	....	.....	
....	..	*	*	*	*	*	*	*	....	....	....	West Indies .	
....	..	*	..	....	*	....	....	*	....	....	....	Brazil.....	
....	..	*†	..	....	....	....	*†	*†	....	....	....	Brazil.....	
....	..	†*	*	....	*†	*	....	†*	....	....	....	Barbados....	
....	..	....	..	....	†	....	....	†	....	....	....	Sombrero ...	
....	..	....	*	....	*	*	....	*	*	....	....	Trinidad	
....	..	....	†	....	....	....	....	†	....	....	....	Barbados....	

TABLE V. E.—*List of Gastropoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Family CYPRÆIDÆ.					
	Genus CYPRÆA Linné.					
678	C. exanthema Linné	....	.....	100.0	$\frac{0}{10}$	Hatteras ....
679	C. cinerea Gmelin	....	.....	.....	$\frac{0}{163}$	Hatteras ....
680	C. spurca Linné	....	.....	.....	$\frac{0}{25}$	Cedar Keys..
681	var. flaveola Lam	....	.....	.....	.....	Key West ...
	Genus TRIVIA Gray.					
682	T. pediculus Linné	....	.....	.....	.....	St. Augustine
683	T. suffusa Gray	....	.....	.....	.....	Cedar Keys..
684	T. subrostrata Gray	....	.....	.....	$\frac{80}{177}$	Florida Str..
685	T. nivea Gray	....	.....	.....	.....	Florida Keys
686	T. candidula Gaskoin	....	.....	.....	$\frac{18}{140}$	Hatteras ....
687	T. globosa Gray	....	.....	.....	$\frac{23}{640}$	Cedar Keys..
688	T. quadripunctata Gray	....	.....	.....	$\frac{0}{15}$	Jupiter Inlet
	Genus ERATO Risso.					
689	E. Maugeriæ Gray	....	.....	.....	$\frac{0}{63}$	Hatteras ....
	Family CARINARIIDÆ.					
	Genus CARINARIA Lamarck.					
690	C. mediterranea Peron & Lesueur	....	.....	.....	.....	N. lat. 40°...
	Genus ATLANTA Lesueur.					
691	A. Peronii Lesueur	43 66	4, 4*a* 110*a*	....	Pelagic	N. lat. 42°...
692	A. Gaudichaudi Eyd. & Soul	66	111	.....	Pelagic	N. lat. 40°...
693	A. rosea Souleyet	....	.....	.....	Pelagic	N. lat. 41°...
694	A. Lamanoni Eyd. & Soul	....	.....	.....	Pelagic	N. lat. 39°...
695	A. pulchella Verrill	....	.....	.....	Pelagic	N. lat. 40°...
696	A. inclinata Souleyet	....	.....	.....	Pelagic	N. lat. 41°...
	Genus OXYGYRUS Benson.					
697	O. Keraudreni Orbigny	....	.....	.....	Pelagic	N. lat. 40°...
	Family STROMBIDÆ.					
	Genus STROMBUS Linné.					
698	S. gigas Linné	....	.....	.....	.....	Florida Keys.
699	S. pugilis Linné	....	.....	.....	.....	Hatteras ....
700	S. bituberculatus Lamarck	....	.....	.....	.....	Jupiter Inlet
701	S. accipitrinus Lamarck	....	.....	.....	.....	Florida Keys.
702	S. costatus Gmelin	....	.....	.....	.....	St. Augustine

TABLE V. E.—*List of Gastropoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Ber-mu-da.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	*	..	....	*	*	*	*	*	....	*	Darien	
....	..	†	..	....	†	†	*	*	*	....	....	Guadalupe ..	
....	..	....	..	*	*	*	....	*	....	*	....	Barbados....	
....	..	....	..	....	*	....	....	*	....	....	....	Swan Islands	
....	..	....	*	*	*	*	....	*	*	....	....	Barbados....	Pliocene.
....	..	....	..	....	*	*	*	*	....	....	....	Barbados....	
....	..	....	..	....	* †	....	....	* †	....	....	....	Barbados....	
....	..	....	..	....	*	....	....	*	....	....	....	Barbados....	
....	..	*	..	....	*	*	....	† *	....	*	....	Barbados....	
....	..	....	..	....	* †	*	....	* †	....	....	....	Barbados....	Pliocene.
....	..	....	..	....	*	....	....	*	*	....	....	Barbados....	
....	..	* †	..	....	*	*	*	....	....	....	....	Aspinwall...	Pliocene.
*	..	*	..	....	*	....	....	*	*	*	....	Tropics	Pliocene
....	..	*	*	*	*	*	*	*	*	*?	?	Tropics	Pliocene.
*	..	....	*	....	....	....	....	....	....	....	....	Tropics	
*	*	....	*	....	....	....	....	....	....	....	....	Tropics	
*	..	....	*	....	....	....	....	....	....	....	....	Tropics	
*	..	....	..	....	....	....	....	....	....	....	....	.....	
*	..	*	..	....	....	....	....	....	....	....	....	Tropics	
*	*	*	*	*	*	*	*	*	*	....	....	Tropics	P. Pliocene.
....	..	....	..	....	*	....	....	*	*	....	....	Carthagena .	
....	..	*	..	*	*	*	*	*	*	....	....	Aspinwall...	
....	..	....	..	*	*	....	....	*	....	....	....	Guadalupe ..	
....	..	....	..	....	*	....	....	*	....	....	....	Guadalupe ..	
....	..	....	*	*	*	*	....	....	....	....	....	Guadalupe ..	? Pliocene

TABLE V. E.—*List of Gastropoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Family TRIFORIDÆ.					
	Genus TRIFORIS Deshayes.					
	Section TRIFORIS s. s.					
703	T. mirabilis C. B. Adams	....	.....	.....	.....	C. Lookout ..
704	T. lilacina Dall	....	.....	9.0	6	Turtle Harb.
	Section MASTONIA Hinds.					
705	T. perversa L. var. nigrocincta Ad...	....	.....	.....	$\frac{0}{30}$	Cape Cod....
706	T. decorata C. B. Ad. var. olivacea Dall	....	.....	.....	.....	W. Florida ..
707	T. pulchella C. B. Adams	....	.....	.....	.....	Florida Str..
708	T. turristhomæ Orbigny	41	6	.....	.....	Hatteras ....
709	T. melanura C. B. Adams	....	.....	.....	.....	Hatteras ....
	Section INELLA Bayle.					
710	T. longissima Dall	20	10	26.0	$\frac{175}{450}$	Hatteras ....
711	T. triserialis Dall	20	5a, 6a	15.5	$\frac{124}{124}$	Hatteras ....
712	var. aspera Jeffreys	....	.....	.....	$\frac{124}{31}$	N. Atlantic ..
713	var. intermedia Dall	20	8	11.0	.....	Florida Str..
714	T. colon Dall	20	12	12.0	$\frac{450}{1002}$	Florida Str..
	Section SYCHAR Hinds.					
715	T. bigemma Watson	....	.....	.....	$\frac{324}{640}$	Fernandina .
716	var. hircus Dall	20	11	12.5	640	Gulf of Mex .
717	T. abrupta Dall	20	9	7.5	640	Gulf of Mex .
718	T. torticula Dall	20	11b	10.5	640	Gulf of Mex .
719	T. inflata Watson	....	.....	.....	$\frac{324}{640}$	Georgia .....
720	var. ibex Dall	....	.....	.....	$\frac{450}{640}$	Florida Str..
721	T. cylindrella Dall	20	6	6.5	640	Gulf of Mex .
722	T. Rushii Dall	....	.....	.....	200	Florida Str..
	Family CERITHIOPSIDÆ.					
	Genus SEILA A. Adams.					
723	S. terebralis C. B. Adams	52	5	.....	$\frac{0}{20}$	Mass. Bay...
	Genus CERITHIOPSIS F. & H.					
724	C. tubercularis Montagu	....	.....	.....	.....	N. Europe...
725	C. Greenii C. B. Adams	52	2	.....	$\frac{3}{10}$	Mass. Bay...
726	C. crystallina Dall	20	3	16.0	$\frac{50}{805}$	Gulf of Mex .
727	C. Martensii Dall	20	2	11.25	$\frac{3229}{11815}$	Lat. 24° 15′ .
728	C. pulchella Jeffreys	....	.....	4.2	$\frac{3}{63}$	Britain.....
729	C. Sigsbeeana Dall	20	1	10.5	220	Gulf of Mex .

TABLE V. E.—*List of Gastropoda*—Continued.

N.J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	*	..	....	*	....	....	*	....	....	....	Jamaica.....	
....	..	....	..	....	*	....	....	....	....	....	....	Florida Str..	
*	*	*	*	....	*	*	....	....	....	*	....	Key West? ..	Pliocene.
....	..	....	..	....	*	*†	....	*	....	....	....	Haiti.....	
....	..	....	..	....	*†	....	....	*	....	....	....	Haiti.....	
....	..	*	..	....	*†	....	....	*	....	....	....	Guadalupe ..	
....	..	....	..	....	*	....	....	*	....	....	....	Jamaica.....	
....	..	....	..	....	†	....	....	†	....	....	....	Cuba.....	
....	..	†	..	....	†	....	....	†	....	....	....	Barbados....	
....	..	....	†	....	†	....	....	†	....	*	....	Florida Str..	
....	..	....	..	....	†	....	....	†	....	....	....	Barbados....	
....	..	....	..	....	†	....	†	†	....	....	....	Yucatan.....	
....	..	....	†	....	....	....	....	†	....	....	....	St. Thomas..	
....	..	....	..	....	....	....	†	†	....	....	....	Yucatan.....	
....	..	....	..	....	....	....	†	†	....	....	....	Yucatan.....	
....	..	....	..	....	....	....	†	†	....	....	....	Yucatan.....	
....	..	....	†	....	....	....	†	†	....	....	....	Culebra.....	
....	..	....	..	....	*†	....	†	....	....	....	....	Yucatan.....	
....	..	....	..	....	....	....	†	....	....	....	....	Yucatan.....	
....	..	....	..	†	....	....	....	†	....	....	....	Bahamas....	
*	..	*	..	....	*	*	*	·	....	†*	....	Haiti	Miocene.
....	..	....	..	....	*	....	....	....	....	*	....	Key West ...	
....	..	*	*	*	*	*	*	*	*	....	....	Haiti	
....	..	....	..	†	†	*†	....	†	....	....	....	Barbados....	
....	..	....	..	....	....	†	....	....	....	....	....	Gulf of Mex .	
....	..	†	..	....	....	....	....	....	....	*	....	Hatteras	
....	..	....	..	....	†	....	....	†	....	....	....	Cuba.....	

TABLE V. E.—*List of Gastropoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Section METAXIA Monterosato.					
730	C. abrupta Watson	20	5	4.3	1A/100	Cape Fear...
731	C. metaxæ Della Chiaje	....	.....	.....	2/20	Hatteras ....
732	var. taeniolata Dall	....	.....	.....	1/2	C. Lookout..
	Subgenus **Eumeta** Mörch.					
733	E. subulata Montagu	20 52	4 1	14.3	2/15	Cape Cod....
	Subgenus **Cerithiella** Verrill.					
734	C. Whiteavesii Verrill	....	.....	.....	233/243	Gulf St. Law.
	Family CERITHIIDÆ.					
	Genus Bittium Leach.					
735	B. alternatum Say	52	4	.....	.....	Mass. Bay...
736	B. ? (Alaba ?) Adamsi Dall	....	.....	.....	.....	Hatteras ....
737	B. ? (Alaba ?) cerithidioides Dall	....	.....	.....	.....	C. Lookout..
	Section DIASTOMA Deshayes.					
738	B. varium Pfeiffer	....	.....	.....	.....	Chesapeake .
	Genus CERITHIUM Bruguière.					
739	C. floridanum Mörch	....	.....	.....	.....	Hatteras ....
740	C. algicola C. B. Adams	....	.....	.....	.....	Tampa . ....
741	C. uncinatum (Gmel.) Tryon	....	.....	.....	.....	Key Largo ..
742	C. eburneum Bruguière	....	.....	.....	.....	Key West ...
743	C. literatum Born	....	.....	.....	.....	Jupiter Inlet
744	var. semiferrugineum Lamarck ..	....	.....	.....	.....	St. Augustine
745	C. muscarum Say	....	.....	.....	.....	Jupiter Inlet
746	C. variabile C. B. Adams	....	.....	.....	.....	Tampa . ....
747	C. minimum Gmelin	....	.....	.....	.....	Tampa . ....
748	var. nigrescens Menke	....	.....	.....	.....	Tampa . ....
	Genus CERITHIDEA Swainson.					
749	C. costata Wood	....	.....	.....	.....	Tampa . ....
750	C. scalariformis Say	....	.....	.....	.....	Georgia .....
751	C. varicosa Sowerby	....	.....	.....	.....	Texas .....
752	C. turrita Stearns	....	.....	.....	.....	Cedar Keys..
	Family PLANAXIDÆ.					
	Genus PLANAXIS Lamarck.					
753	P. nucleus Wood	....	.....	.....	.....	Tortugas ....
754	P. lineatus Da Costa	....	.....	.....	.....	Key West ...

TABLE V. E.—*List of Gastropoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	*	‡†	....	....	....	....	†	....	†	....	Barbados....	
....	..	*	..	....	*†	....	....	†	....	*	....	Key West ...	
....	..	†*	..	....	....	....	....	....	....	....	....	Cape Fear...	
*	..	*	..	....		*	*	*	....	....	....	Grenada.....	
....	..	†	†	....	....	....	....	....	....	....	....	Fernandina..	
*	‡	*‡	..	....	....	....	....	....	....	....	....	C. Lookout..	
....	..	*	..	....	*	*	....	*	....	....	....	Haiti	
....	..	*	..	....	....	....	....	*	....	....	....	Haiti	
....	*	*	..	....	*	*	*	*	....	....	....	St. Thomas ..	
....	..	*	..	....	*	*	....	*	....	....	....	Cuba.....	Pliocene.
....	..	....	..	....	*	*	....	*	*	....	....	Jamaica.....	
....	..	....	..	....	*		....	*	....	....	....	Jamaica.....	
....	..	....	..	....	*	....	....	*	....	....	....	Swan Islands	
....	..	....	..	*	*	*	....	*	*	....	....	Swan Islands	
....	..	....	*	....	*	....	....	*	....	....	....	Santa Cruz..	
....	..	....	..	*	*	*	....	....	*	....	....	Jamaica.....	
....	..	....	..	....	*	*	....	*	*	....	....	Curaçoa.....	
....	..	....	..	....	*	*	....	*	*	....	....	Guadalupe ..	
....	..	....	..	....	*	*	....	*	*	....	....	Venezuela...	
....	..	....	..	....	*	*	....	†	....	....	....	Jamaica.....	
....	..	....	*	*	*	*	*	....	....	....	....	Key West ...	
....	..	....	..	....	....	‡	*	*	....	....	....	Jamaica.....	
....	..	....	..	....	*	*	....	*	....	....	....	Bahamas....	
....	..	....	..	....	*	....	....	*	*	....	....	Darien	
....	..	....	..	....	*	....	....	*	....	....	....	Barbados....	

TABLE V. E.—*List of Gastropoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Family MODULIDÆ.					
	Genus MODULUS Gray.					
755	M. modulus Linné	....	.....	.....	.....	Hatteras ....
756	var. floridanus Conrad	....	.....	.....	.....	Florida Keys.
757	var. catenulatus Philippi	....	.....	.....	.....	Florida Keys.
	Family TRICHOTROPIDÆ.					
	Genus TRICHOTROPIS Sowerby.					
	Subgenus **Mesostoma** Deshayes.					
758	M. migrans Dall	29	8	9.25	80	Florida Str..
	Subgenus **Dolophanes** Gabb.					
759	*D. Gabbi* Dall	29	7	9.0	785	.....
760	D. columbella Dall	....	.....	.....	.....	Gulf of Mex .
	Family CÆCIDÆ.					
	Genus CÆCUM Fleming.					
761	C. floridanum Stimpson	....	.....	.....	$\frac{2}{16}$	Hatteras ....
762	C. pulchellum Stimpson	50	22	.....	$\frac{1}{32}$	Cape Cod ...
763	C. instructum De Folin	....	.....	.....	.....	Hatteras ....
764	C. bipartitum De Folin	....	.....	.....	.....	Hatteras ....
765	C ———	....	.....	.....	.....	Florida Keys.
766	C. Cooperi Smith	43	8	.....	.....	Cape Cod....
767	C. decussatum De Folin	....	.....	.....	.....	Key Largo ..
768	C. carolinianum Dall	....	.....	.....	$\frac{2}{63}$	Hatteras ....
769	C ———	....	.....	.....	.....	Tampa .....
770	C. glabrum Montagu	....	.....	.....	.....	Cape Fear...
	Subgenus **Meioceras** Carpenter.					
771	M. Deshayesii De Folin	....	.....	.....	.....	Tampa .....
772	M. nitidum Stimpson	....	.....	.....	.....	Tampa .....
773	M. undulosum De Folin	....	.....	.....	.....	Charlotte H .
	Family SEGUENZIIDÆ.					
	Genus SEGUENZIA Jeffreys.					
774	S. monocingulata Seguenza	62	88, 89	5.0	$\frac{100}{2033}$	Gulf of Maine
775	S. trispinosa Watson	....	.....	3.5	$\frac{894}{6172}$	Hatteras ....
776	S. ionica Watson	....	.....	4.5	$\frac{390}{1666}$	Gulf of Mex .
777	S. ———	....	.....	.....	$\frac{283}{803}$	Gulf of Mex .
778	S. carinata Watson	....	.....	4.0	$\frac{670}{1125}$	N. Atlantic ..

TABLE V. E.—*List of Gastropoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Ber-mu-da.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	*	..	*	*	*	....	*	*	....	....	Carthagena .	Pliocene.
....	..	....	..	....	*	*	....	*	*	....	....	St. Thomas..	Pliocene.
....	..	....	..	....	*	....	....	*	....	....	....	St. Thomas..	
....	..	....	..	....	†	....	....	†	....	....	....	Havana	
....	..	....	..	....	....	....	....	†	....	....	....	St. Vincent..	Miocene.
....	..	....	..	....	†	....	....	†	....	....	....	Havana	Miocene.
....	..	*	..	....	*	*	....	*	....	....	....	Brazil.....	Pliocene.
*	..	*	..	....	*	....	....	....	....	....	....	Tortugas....	
....	..	*	..	....	....	*	....	....	....	....	....	Tampa	Pliocene.
....	..	*	..	....	....	*	....	....	....	....	....	.....	
....	..	....	..	....	*	....	....	....	....	....	....	Key West ...	
*	..	*	..	....	....	....	....	*	....	....	....	Jamaica	Pliocene.
....	..	....	..	....	*	....	....	*	....	....	....	Bahamas....	
....	..	†	..	....	*	*	....	....	....	....	....	Tortugas....	
....	..	....	..	....	....	*	....	....	....	....	....	Tampa	
....	..	*	..	....	....	*	....	....	....	*	....	Tampa	Pliocene.
....	..	....	..	....	*	*	....	*	....	....	....	Jamaica	
....	..	....	..	....	*	*	....	*	....	....	....	Jamaica	
....	..	....	..	....	....	*	....	*	....	....	....	Jamaica	Pliocene.
†	..	†	..	†	....	†	†	†	....	....	....	Brazil	Miocene.
....	..	†	†	....	....	....	†	†	....	....	....	Brazil	
....	..	....	..	....	†	....	....	†	....	†	....	Culebra	
....	..	....	..	....	....	†	....	†	....	....	....	Old Provid'ce	
....	..	....	..	†	....	....	....	†	....	†	....	Brazil	

TABLE V. E.—*List of Gastropoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Family VERMETIDÆ.					
	Genus SILIQUARIA Bruguière.					
779	S. squamata Blainville	....	.....	.....	3/183	Sarasota ....
780	S. modesta Dall	26	4	26,0	94/805	Cedar Keys..
	Genus VERMICULARIA Lamarck.					
781	V. spirata Philippi	51	4	.....	3/173	N. England..
782	V.? nigricans Dall	....	.....	.....	2/14	Gulf of Mex .
	Genus SIPHONIUM Mörch.					
783	S. nebulosum Dillwyn	....	.....	.....	.....	St. Augustine
	Genus VERMETUS Mörch.					
	Subgenus **Petaloconchus** Lea.					
784	P. erectus Dall	38	4	25.0	37/805	Gulf of Mex .
785	P. irregularis Orbigny	....	.....	.....	.....	Cedar Keys..
	Genus BIVONIA Gray.					
786	B. exserta Dall	26	6	11.0	31/1007	C. Lookout..
	Family TURRITELLIDÆ.					
	Genus TURRITELLA Lamarck					
	Section HAUSTATOR Montfort.					
787	T. variegata Linné	....	.....	.....	.....	Texas.....
788	T. yucatecana Dall	26	3	16.5	640	Gulf of Mex.
	Section TORCULA Gray.					
789	T. exoleta Linné	....	.....	.....	46/170	Cape Florida
790	T. ———	....	.....	.....	40/80	Hatteras ....
791	T. acropora Dall	....	.....	.....	3/413	Hatteras ....
	Family MATHILDIIDÆ.					
	Genus MATHILDA Semper.					
792	M. yucatecana Dall	20	7	8.0	294/640	Savannah ...
793	*M. barbadensis* Dall	26	10	6.2	100	.....
794	M. Rushii Dall	....	.....	5.0	234/485	Fernandina .
795	M. scitula Dall	....	.....	5.25	49/294	Hatteras ....
	Subgenus **Gegania** Jeffreys.					
796	G. Jeffreysi Dall	....	.....	.....	294	Fernandina .

TABLE V. E.—*List of Gastropoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	....	..	....	*	*	....	*	*	....	....	Barbados....	
....	..	....	..	....	†	†	....	†	....	....	....	Curaçoa.....	
....	'	*	*	*	*	*	*	*	.*	....	....	Santa Cruz..	
....	..	....	..	....	*	*	*	*	....	....	....	Florida Str..	
....	..	....	..	*	*	*	....	*	....	....	....	Tortola	
....	..	....	..	....	†	†	....	†	....	....	....	Barbados....	
....	..	....	..	....	*	*	....	*	....	....	....	Guadalupe ..	
....	..	*	..	....	†	†	†	*	....	....	....	Barbados....	
....	..	....	..	....	....	....	*	*	....	....	....	Carthagena .	
....	..	....	..	....	....	....	†	†	....	....	....	Yucatan.....	
....	..	....	..	....	†	†	*	†	....	....	....	Barbados....	Pliocene.
....	..	†*	..	....	....	....	*	....	....	....	....	Texas	
....	..	*†	..	....	*	*†	....	†	....	....	....	Grenada.....	Pliocene.
....	..	....	†	....	....	....	†	†	....	....	....	Yucatan.....	
....	..	....	..	....	....	....	....	†	....	?	....	Barbados....	
....	..	....	†	†	....	....	....	....	....	....	....	Florida Str..	
....	..	†	†	....	....	....	....	....	....	....	....	Fernandina..	
....	..	....	†	....	....	....	....	....	....	....	....	....	

TABLE V. E.—*List of Gastropoda*—Continued.

Sta. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lou.	Range in depth.	Northern extreme range.
	Family LITORINIDÆ.					
	Genus LITORINA Férussac.					
	Section MELARAPHE Muhlfeldt.					
797	L. ziczac Dillwyn					Florida Keys
798	var. lineata Philippi					Jupiter Inlet.
799	L. angulifera Lamarck					Jupiter Inlet.
	Section LITORINA s. s.					
800	L. guttata Philippi					Tortugas
801	L. mespilum Menke					Texas.
802	L. irrorata Say	69	6			Rhode Island
803	L. rudis Donovan	51 69	6 3			Arctic Ocean.
804	L. palliata Say	51	5			Nova Scotia
	Genus LACUNA Turton.					
805	L. vincta Turton	52	19			Arctic Ocean.
	Subgenus **Cithna** A. Adams.					
806	C. tenella Jeffreys				$\frac{1}{2}\frac{1}{0}\frac{1}{5}\frac{1}{0}$	N. Atlantic..
	Genus TECTARIUS Valenciennes.					
807	T. muricatus Linné					Jupiter Inlet.
	Genus ECHINELLA Swainson.					
808	E. nodulosa Pfeiffer					C. Lookout..
	Family FOSSARIDÆ.					
	Genus FOSSARUS Philippi.					
809	F. elegans Verrill	62	87		$\frac{1}{1}\frac{0}{4}\frac{0}{2}$	Rhode Island
	Subgenus **Gottoina** Adams.					
810	G. bella Dall	28	10	3.55	$\frac{1}{1}\frac{5}{0}\frac{5}{7}$	Hatteras
811	G. compacta Dall	28	6	2.33	$\frac{1}{1}\frac{8}{0}\frac{8}{7}$	Hatteras
	Subgenus **Isapis** Carpenter.					
812	I. anomala C. B. Adams				294	Fernandina
	Family LITIOPIDÆ.					
	Genus ALABA A. Adams.					
	A. tervaricosa C. B. Adams					Tampa
	A. cossidea Dall				$\frac{1}{2}\frac{0}{3}\frac{0}{4}$	Fernandina

TABLE V. E.—*List of Gastropoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	....	..	....	*	....	*	*	*	....	....	Barbados....	
....	..	....	..	*	*	....	....	*	....	....	....	Guadalupe ..	
....	..	....	..	*	*	*	*	*	*	....	....	Carthagena .	
....	..	....	..	....	*	....	....	*	....	....	....	St. Thomas ..	
....	..	....	..	....	....	....	*	*	....	....	....	Barbado.s...	
*	..	*	*	*	....	*	*	*	....	....	....	Jamaica.....	
*	..	....	..	....	....	....	....	....	....	*	*	New Jersey..	P. Pliocene.
*	..	....	..	....	....	....	....	....	....	....	....	New Jersey..	P. Pliocene.
*	..	....	..	....	....	....	....	....	....	*	*	New Jersey..	P. Pliocene.
*	..	....	†	†	....	....	....	....	....	†	*	Brazil.....	Pliocene.
....	..	....	..	*	*	*	....	*	*	....	....	Aspinwall...	
....	..	*	..	*	*	....	*	*	*	....	....	Barbados....	
†	†	†	..	....	....	....	....	....	....	....	....	Cape Fear...	
....	..	†	..	....	*	....	....	....	....	....	....	Florida Keys.	
....	..	†	..	....	†	....	....	†	....	....	....	Cuba.....	
....	..	....	**	....	....	....	....	*	....	....	....	Jamaica	
....	..	....	..	....	*	*	....	*	....	....	....	Haiti	
....	..	....	†	....	....	....	....	†	....	....	....	Campeche Bk	

TABLE V. E.—*List of Gastropoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
839	Rissoa ———	....	....	....	63	Hatteras ....
840	R. acuticostata Dall	19	10	3.7	$\frac{34}{6}$	Hatteras ....
841	R. pyrrhias Watson	....	....	3.0	$\frac{30}{30}$	Florida Str ..
842	R. xanthias Watson	..	....	2.5	$\frac{25}{350}$	Florida Str ..
843	R. syngenes Verrill	....	....	3.0	142	Hatteras ....
	Genus BENTHONELLA Dall.					
844	B. gaza Dall	42	5	6.5	$\frac{6}{363}$	Fernandina..
845	B. Fischeri Dall	....	....	5.3	$\frac{940}{1066}$	Cedar Keys..
846	B. nisonis Dall	....	....	9.0	940	Gulf of Mex.
	Genus RISSOINA Orbigny.					
847	R. decussata Montagu	....	....	....	$\frac{8}{17}$	Cape Fear...
848	R. lævigata C. B. Adams	....	....	....	$\frac{0}{12}$	C. Lookout..
849	R. bryerea Montagu	....	....	....	$\frac{0}{18}$	Florida Keys
850	R. Chesnelii Michaud	....	....	....	....	Hatteras ....
851	R. multicostata C. B. Adams	....	....	....	....	Key Largo...
852	R. Sagraiana Orbigny	....	....	....	....	Florida Str..
853	R. cancellata Philippi	....	....	....	....	Florida Keys
	Family ADEORBIDÆ.					
	Genus SKENEA Fleming.					
854	S. planorbis Fabricius	52	18	....	....	Arctic Sea...
	Genus ADEORBIS Wood.					
855	A. supranitidus Wood	41	7, 7*a*	....	$\frac{15}{2}$	N. Atlantic ..
856	var. Orbignyi Fischer	....	....	....	$\frac{19}{10}$	Norway ....
857	A. Beani Fischer	....	....	....	....	Florida Keys
858	*A.? olivaceus* Verrill	44	5	4.0	$\frac{1}{12}$	Gulf of Maine
	Genus CLATHRELLA Recluz.					
859	C. naticoides Dall	....	....	....	22	Hatteras ....
	Family AMPULLARIIDÆ.					
	Genus AMPULLARIA Lam.					
860	A. depressa Say	....	....	....	....	Georgia ....
861	A. caliginosa Reeve	....	....	....	....	Florida ....
	Family ASSIMINEIDÆ.					
	Genus ASSIMINEA Leach.					
862	A. Auberiana Orbigny	....	....	....	....	Cedar Keys.
863	A. concinna C. B. Adams	....	....	....	....	Key West ...
864	A. ———	....	....	....	....	Tampa ....

TABLE V. E.—*List of Gastropoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
*	..	*	*	*	*	....	....	*	....	....	....	Brazil.....	P. Pliocene.
....	..	....	..	....	†	....	....	†	....	....	....	Jamaica	
....	..	....	..	....	....	....	....	†	....	....	....	Dominica ...	
....	..	†	..	....	....	....	*	†	....	....	*	Sombrero ...	
....	..	...	..	....	....	....	....	†	....	....	....	Barbados....	
....	..	....	..	....	†	....	....	†	....	....	....	Cuba.....	
...	..	†	†	†	....	....	....	*	....	....	....	Martinique..	
††	..	†*	..	†	....	....	....	†	....	....	....	Florida Str..	
....	..	†	..	....	....	....	....	*	....	....	....	Porto Plata .	
....	..	....	..	....	....	....	*	*	....	....	....	Guadalupe ..	
....	..	....	..	....	*	....	....	....	....	....	....	St. Thomas..	
....	..	....	..	....	....	....	*	....	....	....	....	St. Thomas..	
†	†	....	..	....	†	....	....	†	....	....	....	Barbados....	
....	..	....	..	†	....	....	....	....	....	....	....	Cuba	
*	..	....	..	....	....	....	....	....	....	....	....	New Jersey..	
*	..	....	..	....	....	....	....	....	....	....	....	New York ...	
....	..	....	..	...	....	*	....	....	....	....	....	Gulf of Mex.	
†	..	†	..	....	....	....	....	....	....	....	....	Hatteras	
†	..	†	..	....	....	....	....	†	....	....	....	Barbados....	
....	..	†	..	....	....	....	....	....	....	....	....	.....	
....	..	†	..	....	....	....	....	....	....	*†	....	Hatteras	
....	..	*†	†	†	....	....	....	....	....	....	....	Florida Str..	
...	..	†	..	....	....	....	....	....	....	....	....	Hatteras	P. Pliocene.
....	..	....	..	†	....	....	†	....	....	....	....	Yucatan	

TABLE V. E.—*List of Gastropoda*—Continued.

Sort. No.	Name and authority for species	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
839	Risson ——	....	....	....	63	Hatteras ....
840	R. acuticostata Dall	19	19	3.7	[illegible]	Hatteras ....
841	R. pyrrhias Watson	....	....	3.0	[illegible]	Florida Str ..
842	R. xanthias Watson	..	....	2.5	[illegible]	Florida Str ..
843	R. syngenes Verrill	....	....	3.0	142	Hatteras ....
	Genus BENTHONELLA Dall.					
844	R. gaza Dall	42	5	6.5	[illegible]	Fernandina..
845	R. Fischeri Dall	....	....	5.3	[illegible]	Cedar Keys..
846	R. nisonis Dall	....	....	9.0	940	Gulf of Mex.
	Genus RISSOINA Orbigny.					
847	R. decussata Montagu	....	....	....	[illegible]	Cape Fear...
848	R. lævigata C. B. Adams	....	....	....	[illegible]	C. Lookout..
849	R. bryerea Montagu	....	....	....	[illegible]	Florida Keys
850	R. Chesneli Michaud	....	....	....	....	Hatteras ....
851	R. multicostata C. B. Adams	....	....	....	....	Key Largo...
852	R. Sagraiana Orbigny	....	....	....	....	Florida Str..
853	R. cancellata Philippi	....	....	....	....	Florida Keys
	[illegible]					
	Genus SKENEA Fleming					
854	[illegible]	[illegible]	[illegible]	....	....	Arctic Sea...
	Genus ATPORBIS Wood					
[illegible]	[illegible]	[illegible]	[illegible]	....	[illegible]	N. Atlantic..
[illegible]	[illegible]	[illegible]	[illegible]	....	....	N. Bay .....
[illegible]	[illegible]	[illegible]	....	....	....	Florida Keys
[illegible]	[illegible]	..	[illegible]	4	[illegible]	Gulf of Mex.
	Genus CLATHURELLA Reeve					
[illegible]	[illegible]	[illegible]	....	....	2	Hatteras ....
	[illegible]					
	Genus AMPULLINA Lam.					
[illegible]	[illegible]	[illegible]	....	....	....	Georgia .....
[illegible]	[illegible]	[illegible]	..	....	....	Florida .....
	[illegible]					
	Genus ASSIMINEA Leach					
[illegible]	[illegible]	[illegible]	[illegible]	..	....	Cedar Keys.
[illegible]	[illegible]	[illegible]	[illegible]	..	....	Key West ...
[illegible]	[illegible]	[illegible]	[illegible]	....	....	Tampa .....

TABLE V. E.—*List of Gastropoda*—Continued.

N. J.	Va.	Hat.	Ga	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	†	..	....	....	....	....	....	....	....	....	.....	
....	..	†	..	....	....	*†	†	†	....	....	....	Barbados....	
....	..	....	..	....	†	....	....	†	....	....	....	Culebra.....	
....	..	....	..	†	....	....	....	†	....	....	....	Brazil.....	
....	..	†	..	....	....	....	....	....	....	....	....	.....	
....	..	....	†	†	....	†	†	†	....	....	....	Cuba.....	
....	..	....	..	....	....	†	†	†	...	....	....	Cuba.....	
....	..	....	..	....	....	†	....	....	....	....	....	Cedar Keys .	
....	..	*	..	....	*	*	....	*	....	....	....	Haiti	Pliocene.
....	..	*	..	....	*	*	....	*	....	....	....	St. Thomas..	Pliocene.
....	..	....	..	....	*	....	....	*	*	....	....	Barbados....	
....	..	*	..	....	*	*	....	*	....	....	....	Guadalupe ..	Pliocene.
....	..	....	..	....	*	....	....	*	....	....	....	Guadalupe ..	Pliocene.
....	..	....	..	....	*	....	*	*	....	....	....	Martinique ..	
....	..	....	..	....	*	....	....	*	*	...	....	Haiti	
*	..	*	..	....	....	*	....	....	....	*	*	Charlotte H ..	
....	..	*	..	....	....	*	....	....	....	*†	....	Cedar Keys .	Pliocene.
....	..	*	..	....	....	*	....	*†	....	*†	....	Guadalupe ..	Pliocene.
....	..	....	..	....	*	....	....	*	....	....	....	Guadalupe ..	
?†	..	....	..	....	....	....	....	....	....	....	....	Rhode Island	
....	..	*	..	....	....	....	....	†	....	....	....	Old Provid'ce	
....	..	....	*	*	*	*	*	*	....	....	....	Mexico.....	P. Pliocene.
....	..	....	..	....	....	*	*	*	....	....	....	Central Am..	
....	..	....	..	....	*	*	....	*	*	....	....	Cuba.....	
....	..	....	..	....	*	....	....	*	....	....	....	Haiti	
....	..	....	..	....	....	*	....	....	....	....	....	.....	

TABLE V. E.—*List of Gastropoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Family TRUNCATELLIDÆ.					
	Genus TRUNCATELLA Risso.					
865	T. caribæensis Sowerby					Alabama
866	T. bilabiata Pfeiffer					Sarasota
867	T. pulchella Pfeiffer					Tampa
868	T. subcylindrica Gray					Tampa
	Family ——————?					
	Genus SEPARATISTA Gray.					
	Subgenus Haloceras Dall.					
869	H. cingulata Verrill				$\frac{2}{14\text{-}27}$	Gulf of Maine
	Family CHORISTIDÆ.					
	Genus CHORISTES Carpenter.					
870	*C. elegans* Carpenter	44	9a–b		$\frac{1}{0}\frac{2}{3}$	Gulf of Me.?
	Family CALYPTRÆIDÆ.					
	Genus MITRULARIA Schumacher.					
871	M. equestris Linné				$\frac{1}{1}\frac{5}{9}$	Hatteras
	Genus CRUCIBULUM Schumacher					
872	C. auricula Gmelin				$\frac{5}{1}\frac{5}{1}$	Cedar Keys
873	C. striatum Say	50	27, 28		$\frac{3}{1}\frac{2}{7}$	Nova Scotia
	Genus CALYPTRÆA Lamarck.					
874	C. Candeana Orbigny				$\frac{6}{5}\frac{2}{7}$	Hatteras
	Genus CREPIDULA Lamarck.					
875	C. fornicata Linné	48 50	16 23, 24		$\frac{0}{1}\frac{2}{5}$	Pr. Ed. Isl'd
876	C. convexa Say	50	25		$\frac{0}{2}\frac{2}{7}$	Nova Scotia
	Section JANACUS Mörch.					
877	C. plana Say	48 50	12 26		$\frac{0}{1}\frac{2}{7}$	Pr. Ed. Isl'd
	Section SANDALIUM Schum.					
878	C. aculeata Gmelin				$\frac{0}{2}\frac{2}{3}$	C. Lookout
	Family CAPULIDÆ.					
	Genus CAPULUS Montfort.					
879	C. hungaricus Linné	44 48	6 8	12.0	$\frac{0}{1}\frac{2}{3}\frac{2}{3}$	Iceland

TABLE V. E.—*List of Gastropoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	....	..	....	*	*	?	*	....	....	....	Guadalupe ..	
....	..	....	..	....	*	*	....	*	....	....	....	Honduras ...	
....	..	....	?	*	*	*	*	*	....	....	....	St. Thomas ..	
....	..	....	..	....	*	*	....	*	*	....	....	St. Thomas ..	
†	?†	....	..	....	....	....	....	....	....	....	....	Delaware B .	
†?	..	....	..	....	....	....	....	....	....	....	....	Rhode Island	P. Pliocene.
....	..	*	..	....	*†	†	*	*	....	....	....	Barbados....	Pliocene.
....	..	....	..	...	*	*	*	*	....	....	....	Barbados....	Pliocene.
*	..	*	..	....	†	....	....	?	....	....	....	Florida Keys.	Pliocene.
....	..	*	..	*	*	*	....	*	....	....	....	Haiti.....	
*	*	*	*	*	*	*	*	*	....	....	....	Carthagena .	Miocene.
*	..	*	*	*	....	....	....	....	....	....	....	East Florida.	
*	*	*	*	*	*	*	*	*	*	?	....	Trinidad	Miocene.
....	..	*	*	*	*	*	*	*	*	....	....	Barbados....	Pliocene.
†.	..	†	..	....	*	....	....	....	*	*†	....	Florida Keys.	Miocene.

TABLE V. E.—*List of Gastropoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Subgenus **Polynices** Montfort.					
905	P. uberina Orbigny				1/10	Hatteras
906	P. lactea Guilding					Florida Keys.
907	P. brunnea Link					Tortugas
	Genus SIGARETUS Lamarck.					
908	S. perspectivus Say					New York
909	S. maculatus Say					Hatteras
910	S. minor Dall			4.0	1/4	Cape Florida
	Subgenus **Eunaticina** Fischer.					
911	E. carolinensis Dall			5.5	43/174	Hatteras
	Genus GYRODES Conrad.					
912	G. depressa Seguenza				14/350	N. Atlantic
	Family LAMELLARIIDÆ.					
	Genus LAMELLARIA Montagu.					
913	L. Rangii Bergh					Gulf of Mex.
914	L. pellucida Verrill	72	5		85/767	Rhode Island
	Genus MARSENINA Gray.					
915	M. ampla Verrill					Eastport
	Superfamily DOCOGLOSSA.					
	Family ACMÆIDÆ.					
	Genus ACMÆA Eschscholtz.					
916	A. Candeana Orbigny					Florida Str.
917	A. punctulata Gmelin					Florida Keys.
918	var. pulcherrima Guilding					Key West
919	A. melanoleuca Gmelin					Charlotte H.
920	A. testudinalis Linné	51	2,3	40.0	0/3	Arctic Sea
921	var. alveus Couthouy	51	7,8		0/3	Arctic Sea
	Genus PECTINODONTA Dall.					
922	*P. arcuata* Dall	25	3*a*, *b*	5.0	226/882	Haiti
	Family LEPETIDÆ ?					
	Genus PROPILIDIUM F. & H.					
923	P.? elegans Verrill			3.5	1395	Chesapeake
924	*P.? pertenue* Jeffreys				640	Rhode Island
925	P. ancyloide F. & H.	31	2*b*, *c*			Norway

TABLE V. E.—*List of Gastropoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	†*	..	....	*	*	....	†	....	....	....	Sombrero....	
....	..	....	..	....	*	†	*	*	*	....	....	Brazil.....	
....	..	....	..	....	*	....	*	*	....	....	....	Trinidad	
*	*	*	..	*	*	*	*	*	....	....	....	Martinique ..	
....	..	*	..	....	*	*	....	*	....	....	....	Guadalupe ..	
....	..	....	..	....	†	†	....	†	....	....	....	Sombrero ...	
....	..	†	..	....	....	....	....	....	....	....	....	.....	
....	..	*†	..	....	....	....	....	....	....	*	....	C. Lookout..	Pliocene.
....	..	....	..	....	....	....	*	....	...	....	....	.....	
†	†	*	..	....	....	....	....	....	....	....	....	Hatteras	
....	..	....	..	....	....	*	....	....	....	....	....	Sarasota	
....	..	....	..	....	*	....	*	*	....	....	....	Barbados....	
....	..	....	..	....	*	....	....	*	....	....	....	Barbados....	
....	..	....	..	*	*	....	....	*	....	....	....	Cuba.....	
....	..	....	..	....	*	*	....	*	....	....	....	St. Thomas ..	
*	..	....	..	....	....	....	....	....	....	*	*	New York...	P. Pliocene.
*	..	....	..	....	....	....	....	....	....	....	*	New York ..	P. Pliocene.
....	..	....	..	....	....	....	....	†	....	....	....	St. Lucia	
†	†	....	..	....	....	....	....	....	....	....	....	Virginia	
?†	..	....	..	....	....	....	....	....	....	....	....	.....	
....	..	....	..	....	....	....	....	....	....	†	....	.....	

TABLE [illegible].—List of [illegible]—Continued.

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Genus LEPETELLA Verrill					
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Rhode Island
	[illegible]					
	[illegible]					
	Genus BOTTELLINA Gray					
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Key West
	[illegible]					
	Genus ADDISONIA Dall					
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Rhode Island
	[illegible]					
	Genus COCCULINA Dall					
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Rhode Island
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Delaware
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Rhode Island
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Chesapeake
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	N. Atlantic
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Rhode Island
	Family PHASIANELLIDÆ.					
	Genus PHASIANELLA Lamarck.					
[illegible]	*P. varia* Orbigny	19	13.6	2.6	[illegible]	Hatteras
[illegible]	*P. australis* Orbigny	[illegible]	[illegible]	[illegible]	[illegible]	C. Lookout
[illegible]	*P. pulchella* C. B. Adams	[illegible]	[illegible]	[illegible]	[illegible]	Cedar Keys
	Family TURBINIDÆ.					
	Genus TURBO Linné.					
[illegible]	*T. Spengleriana* Chemnitz	[illegible]	[illegible]	[illegible]	[illegible]	Florida Str.
[illegible]	*T. floras* Kiener	[illegible]	[illegible]	[illegible]	[illegible]	Tortugas
940	*T. castaneus* Gmelin	[illegible]	[illegible]	[illegible]	[illegible]	Hatteras
941	*T. cremulatus* Gmelin	[illegible]	[illegible]	[illegible]	[illegible]	Hatteras
	Genus ASTRALIUM Link.					
942	*A. calcatum* Gmelin	[illegible]	[illegible]	[illegible]	[illegible]	Key West
943	*A. imbricatum* Gmelin	[illegible]	[illegible]	[illegible]	[illegible]	Florida Keys
944	*A. tuber* Linné	[illegible]	[illegible]	[illegible]	[illegible]	Jupiter Inlet
945	*A. longispinum* Lamarck	[illegible]	[illegible]	[illegible]	[illegible]	Florida Keys
946	*A. brevispinum* Lamarck	[illegible]	[illegible]	[illegible]	[illegible]	Florida Keys
	A. americanum Gmelin	[illegible]	[illegible]	[illegible]	[illegible]	Florida Keys

TABLE V. E.—*List of Gastropoda*—Continued.

N.J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
†	†	....	†	....	....	†	....	....	....	†	....	Cedar Keys..	
....	..	....	..	....	*	....	....	*	....	....	....	St. Thomas..	
†	†	....	..	....	....	....	....	....	....	?†	....	Chesapeake .	
?†	..	....	..	....	....	....	....	†	....	....	....	Barbados....	
†	..	....	..	....	....	....	....	....	....	....	....	.....	
†	..	....	†	....	....	....	....	†	....	....	....	Barbados....	
†	†	*	..	....	....	....	....	....	....	....	....	Hatteras	
....	..	†	..	....	....	....	....	....	....	†	....	Hatteras	
†	†	†	†	....	....	....	....	....	....	....	....	Fernandina .	
....	..	†*	..	....	†	....	....	†	....	....	....	Martinique..	
....	..	*	..	....	*	....	....	*	*	....	....	Guadalupe ..	
....	..	....	..	....	*	*	....	*	*	....	....	St. Thomas..	
....	.	....	..	?	....	....	....	*	....	....	....	Guadalupe ..	
....	..	....	..	....	*	....	....	....	....	....	....	.....	
....	..	*	..	....	*	*	....	*	....	....	....	Trinidad	
....	..	*	..	*	*	*	....	*	....	....	....	Barbados....	
....	.	....	..	....	*	....	....	*	....	....	....	Tortola.....	
....	..	....	..	....	*	....	....	*	....	....	....	St. Lucia....	
....	..	....	..	*	*	....	....	*	....	....	....	Martinique ..	
....	..	....	..	..	*	....	....	*	*	....	....	Barbados....	
....	..	....	..	....	*	....	....	*	....	....	....	Aspinwall ...	
....	..	....	..	....	*	....	....	*	....	....	....	Carthagena..	

TABLE V. E.—*List of Gastropoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Genus LEPTOTHYRA Carpenter.					
948	L. induta Watson	38	6	7.0	1/185	Hatteras
949	*L. Philipiana* Dall	34	7, 7*a*	3.5	138	
950	L. Linnæi Dall	33	9	5.5	116/805	Florida Str.
	Family TROCHIDÆ.					
	Genus OMPHALIUS Philippi.					
951	*O. excavatus* Lamarck					Florida Str.
952	O. fasciatus Born					Texas
953	O. indusii Gmelin					Key West
954	O. Hotessierianus Orbigny					Florida Str.
	Genus LIVONA Gray.					
955	L. pica Linné					Charlotte H.
	Genus GAZA Watson.					
956	G. superba Dall	22	4, 4*a*	32.0	3/124	Gulf of Mex.
957	G. Fischeri Dall	37	6	16.0	1/26	Gulf of Mex.
	Subgenus **Callogaza** Dall.					
958	C. Watsoni Dall	22 23 24	7, 7*a* 1, 1*a* 2, 2*a*	7.75 8.0 6.0	2/40	Gulf of Mex.
	Genus MICROGAZA Dall.					
959	M. rotella Dall	22	5, 5*a*	4.0	73/805	Hatteras
	Genus UMBONIUM Link.					
960	U. Bairdii Dall	21	6, 6*a*	4.0	100/640	Florida Keys
	Genus TEINOSTOMA Adams.					
961	T. semistriata Orbigny					Key West
962	T. cryptospira Verrill			2.5	61/147	Hatteras
963	T. ——			3.5	294	Fernandina
	Subgenus **Ethalia** H. & A. Adams.					
964	E. multistriata Verrill			2.5	1/147	Hatteras
965	E. solida Dall	28	3, 5	2.0	310	Gulf of Mex.
966	E. ——				55/294	Fernandina
967	E. reclusa Dall	28	7, 8	1.0	1/3	Hatteras
968	E. suppressa Dall			0.75		West Florida
	Genus DILLWYNELLA Dall.					
969	*D. modesta* Dall.	21	3, 3*a*	3.0	226	
	Genus DISCOPSIS De Folin.					
970	D. omalos De Folin			0.2		Fernandina

TABLE V. E.—*List of Gastropoda*—Continued.

N. J.	Va	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	†	†	....	*†	....	†	†	....	..	....	Martinique..	
....	..	....	..	....	....	....	....	†	...	....	....	Dominica	
....	..	....	..	....	†	....	....	†	....	....	....	Barbados....	
...	..	....	..	....	?	....	....	*	....	....	....	Guadalupe ..	
....	..	....	..	....	*	....	....	....	....	....	....	Trinidad	
....	..	....	..	....	*	....	....	....	....	....	....	Santa Cruz..	
....	..	....	..	?	*?	....	....	*	....	..	....	Guadalupe ..	
....	..	....	..	....	*	*	....	*	*	....	....	Aspinwall...	
....	..	....	..	....	....	†	...	†	....	....	....	Barbados....	
....	..	....	..	....	....	†	....	†	....	....	....	St. Lucia....	
....	..	....	..	....	†	†	....	†	....	....	....	Barbados....	
....	..	†	..	....	†	....	....	†	...	....	....	Barbados....	
....	..	....	..	....	†	....	....	†	....	....	....	Yucatan.....	
....	..	....	..	....	*	....	....	*	....	....	....	St. Thomas..	
....	..	†	..	....	....	....	....	....	....	....	....	.....	
....	..	....	†	....	....	....	....	†	....	....	....	Barbados....	
....	*†	....	*	....	....	....	....	*	...	....	....	Haiti	
....	..	....	..	....	....	†	....	†	....	....	....	Cuba.....	
....	..	....	†	†	....	....	....	....	....	....	....	S. E. Florida.	
....	..	*†	..	....	....	....	....	....	....	....	....	Cape Fear...	
....	..	....	..	....	....	*	....	....	....	....	....	Gulf of Mex.	
....	..	....	..	....	....	....	....	†	....	....	....	St. Lucia....	
....	..	....	*?	....	....	....	....	†	....	....	....	Guadalupe ..	

Table V.—List of Gastropoda—Continued.

No.	Name and authority for species.	Pl.	Figs.	Alt. in m.	Range in m.	Northern extreme range.
	Genus CYCLOSTREPTUS Simpson.					
[illegible]	C. [illegible] Simpson	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	C. [illegible] Simpson	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Genus CYCLOTOMA Swainson.					
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

TABLE V. E.—*List of Gastropoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time
....	..	*	..	....	*	*	....	....	....	....	....	Florida Keys	
....	.	....	..	....	....	*	....	....	....	....	....	Gulf of Mex.	
....	..	*	*	*	*	*	*	....	....	....	....	Vera Cruz...	
†	†	*†	..	†	†	....	....	†	....	....	....	Florida Keys	
....	..	....	..	....	....	....	....	†	....	....	....	Barbados....	
....	..	....	..	....	*	....	†	†	....	....	....	Yucatan	
....	..	....	..	....	*	....	....	*	....	....	....	Cuba.....	
....	..	....	..	....	*	....	....	*	....	....	....	Cuba	
....	..	....	..	....	†	†	....	†	....	....	....	Jamaica	
....	..	....	..	....	†	....	†	†	†	....	....	Dominica ...	
....	..	†	..	†	†	*	†	†	....	....	....	Yucatan	
....	..	....	..	....	†	....	....	†	....	....	....	Barbados....	
....	..	*†	..	....	*	....	*	*	....	....	....	St. Thomas..	
....	..	....	..	....	†	....	....	†	....	....	....	Cuba.....	
....	..	....	..	....	....	....	....	†	....	....	....	Grenada	
....	..	*	*	*	*	*	*	*	....	....	....	Carthagena .	Pliocene.
....	..	*	*	*	*	*	....	*	....	....	....	Honduras ...	
....	..	....	..	....	....	*	...	*	....	....	....	Mauritius ...	
....	..	*	..	....	....	*	....	*	....	....	....	Yucatan	
....	..	†	..	....	....	....	....	....	....	....	....	.....	
....	..	†	..	....	....	....	....	....	....	....	....	.....	
....	..	....	..	....	†	....	....	†	....	....	....	Cuba	
....	..	†	..	....	†	†	....	†	....	....	....	Barbados....	
....	..	....	..	....	....	....	....	†	....	....	....	Barbados....	
....	..	....	..	....	....	....	....	†	....	....	....	Grenada	
....	..	....	..	....	†	....	....	†	....	....	....	Haiti	
....	..	....	..	....	†	....	....	†	....	....	....	Cuba.....	
....	..	....	..	....	†	....	....	†	....	....	....	Culebra	

TABLE V. E.—*List of Gastropoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Subgenus Solariella A. Adams.					
999	S. amabilis Jeffreys	....	.....	.....	123/888	Norway
1000	S. lamellosa V. & S	63	98	.....	18/192	Rhode Island
1001	*S. obscura* Couthouy	52	16	.....	10/487	Arctic Sea
1002	S. ægleis Watson	....	.....	.....	320/640	Fernandina
1003	var. lata Dall	....	.....	.....	313/808	Florida Str.
1004	var. rhina Watson	....	.....	.....	384/1000	Florida Str.
1005	var. clavata Watson	....	.....	.....	320/808	Florida Str.
1006	S. infundibulum Watson	....	.....	.....	768/1685	Delaware
1007	S. Ottoi Philippi	44 63	14 97	.....	64/1585	Hebrides
1008	S. scabriuscula Dall	21	10, 10*a*	4.75	539	Gulf of Mex.
1009	S. lissocoma Dall	21	8, 8*a*	5.5	337/321	Cedar Keys
1010	S. lacunella Dall	21	1, 1*a*	4.5	10/124	C. Hatteras
1011	var. depressa Dall	....	.....	.....	805	Gulf of Mex.
1012	S. iris Dall	21	7, 7*a*	5.0	119	Florida Keys.
1013	S. ———	....	.....	.....	294	Fernandina
1014	S. ———	....	.....	.....	169	Cedar Keys
1015	S. lubrica Dall	21	9, 9*a*	4.0	116/808	Cedar Keys
1016	var. iridea Dall	....	.....	3.8	193	Cape Florida.
	Genus EUCHELUS Philippi.					
1017	E. guttarosea Dall	33	7	5.0	16/480	Florida Str.
1018	E. eucasta Dall	....	.....	.....	440	Georgia
	Genus BASILISSA Watson.					
1019	B. alta Watson	....	.....	.....	339/1019	Cedar Keys
1020	var. delicatula Dall	22	2, 2*a*	5.0	805	Gulf of Mex.
1021	B. superba Watson	....	.....	.....	400/1400	Gulf of Mex.
	Section ANCISTROBASIS Dall.					
1022	B. costulata Watson	....	.....	.....	16/640	Georgia
1023	var. depressa Dall	23	4, 4*a*	2.5	640	Gulf of Mex.
	Family DELPHINULIDÆ.					
	Genus LIOTIA Gray.					
1024	L. cruentata Muhlfeldt	....	.....	.....	.....	Key West
1025	L. Riisii Dunker	....	.....	.....	.....	Tortugas
1026	L. Briareus Dall	24	5, 5*a*	7.5	78/480	Florida Str.
1027	var. perforata Dall	....	.....	.....	76/480	Florida Str.
	var. aspina Dall	....	.....	.....	76/480	Florida Str.
	L. Bairdii Dall	33	8	6.0	18/60	Hatteras
	var. trullata Dall	....	.....	.....	.....	Gulf of Mex.

TABLE V. E.—*List of Gastropoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	....	..	....	†	†	....	†	....	*	....	St. Lucia....	
....	..	*†	..	....	....	....	....	†	....	....	....	Barbados ...	
?†	..	....	..	....	....	....	....	....	....	*†	*	Rhode Island	
....	..	....	†	....	....	†	....	†	....	....	....	St. Vincent..	
....	..	....	..	†	†	....	....	†	....	†	....	Martinque...	Pliocene. *
....	..	....	..	....	†	....	....	†	....	†	....	St. Vincent..	
....	..	....	..	....	†	....	....	†	....	....	....	Brazil.....	
†	†	....	..	....	†	....	....	†	†	....	....	Brazil.....	
†	†	....	..	....	....	....	....	†	....	†	....	St. Thomas..	Pliocene.
....	..	....	..	....	†	....	....	†	....	....	....	Cuba	
....	..	....	..	....	†	†	....	....	....	....	....	Gulf of Mex.	
....	..	†	..	....	†	....	....	†	....	...	....	Santa Cruz..	
....	..	....	..	....	†	....	....	....	....	....	....	Florida Keys.	
....	..	....	..	....	†	....	....	....	....	....	....	Florida Str..	
....	..	....	†	....	....	....	....	....	....	....	....	.....	
....	..	....	..	....	....	†	....	....	....	....	....	Gulf of Mex.	
....	..	....	..	....	†	†	....	†	....	....	....	St. Lucia....	
....	..	....	..	....	†	†	....	....	....	....	....	Gulf of Mex.	
....	..	....	..	....	†	....	....	*†	....	....	....	Haiti.....	
....	..	....	†	....	....	....	....	....	....	....	....	.....	
....	..	....	..	....	....	†	....	†	....	....	....	Brazil.....	
....	..	....	..	....	†	....	....	†	....	....	....	Tobago	
....	..	....	..	....	....	†	....	....	....	....	....	Australia....	
....	..	....	†	....	*	....	....	†	....	....	....	Culebra	
....	..	....	..	....	....	....	†	†	....	....	....	Yucatan.....	
....	..	....	..	....	*	....	....	*	....	....	....	Honduras ...	
....	..	....	..	....	*	....	....	*	....	...	....	St. Thomas..	
....	..	....	..	....	†	....	....	†	....	....	....	Barbados....	
....	..	....	..	....	†	....	....	†	....	....	....	Barbados....	
....	..	....	..	....	†	....	....	†	....	....	....	Barbados....	
....	..	†	†	....	*†	....	....	†	....	....	....	Havana.....	
....	..	....	..	....	†	....	....	†	....	....	....	Florida Str..	

TABLE V. E.—*List of Gastropoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
1031	Liotia tricarinata Stearns	....	.....	.....	18/22	Hatteras ....
1032	L. miniata Dall	28	11	2.0	15	Florida Str..
1033	L. variabilis Dall	23	2, 2a	4.5	33/170	Hatteras ....
1034	var. *microforis* Dall	....	.....	.....	44/170	Cuba.....
	Subgenus **Lippistes** Montfort.					
1035	L. acrilla Dall	32	6, 11	2.0	.....	Garden Key .
1036	L. amabilis Dall	32	9, 12	2.0	80	Florida Str..
	Subgenus **Laxispira** Gabb.					
1037	L. nitida Verrill	46	11	5.0	1423	N. lat. 38°...
	Family CYCLOSTREMATIDÆ.					
	Genus VITRINELLA C. B. Adams.					
1038	V. multicarinata Stimpson	....	.....	1.5	15	Hatteras ....
1039	V. interrupta C. B. Adams	....	.....	.....	.....	Tampa.....
	Genus CYCLOSTREMA Marryat.					
1040	C. trochoides Jeffreys	....	.....	2.0	38/113	N. Atlantic..
1041	C. fulgidum Jeffreys	63	99	2.0	487/856	Gulf of Maine
1042	C. ornatum Verrill	....	.....	.....	15/113	Hatteras ....
1043	*C. cingulatum* Verrill	....	.....	2.0	547	N. lat. 40°..
1044	C. valvatoides Jeffreys	....	.....	.....	168/1024	C. Lookout..
1045	C. diaphanum Verrill	....	.....	2.5	38/113	Rhode Island
1046	C. turbinum Dall	33	5	2.75	80	Florida Str..
1047	C. pompholyx Dall	28	9	3.0	334/405	Fernandina ..
1048	C. cistronium Dall	....	.....	1.6	53/83	Hatteras ....
1049	C. cancellatum Jeffreys	....	.....	2.5	394/1000	N. Atlantic..
	Subgenus **Granigyra** Dall.					
1050	G. limata Dall	....	.....	2.5	310	Florida Str..
	Genus MOLLERIA.					
1051	M. costulata Möller	72	9	.....	10/394	N. Atlantic..
	Family NERITIDÆ.					
	Genus NERITA Bruguière.					
1052	N. peloronta Linné	....	.....	.....	.....	Jupiter Inlet
1053	N. tessellata Gmelin	....	.....	.....	.....	Jupiter Inlet
1054	var. præcognita C. B. Adams	....	.....	.....	.....	S. Florida ..
1055	N. versicolor Lamarck	....	.....	.....	.....	Pine Key..

TABLE V. E.—*List of Gastropoda*—Continued.

N.J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	*	..	....	....	*	....	....	....	....	....	Tampa.....	Pliocene.
....	..	....	..	*	....	....	....	*	....	....	....	Barbados....	
....	..	*	..	....	†	....	....	†	....	....	....	Barbados....	
....	..	....	..	....	....	....	....	†	....	....	....	Grenada	
....	..	....	..	....	*	....	....	....	....	....	....	Florida Str..	
....	..	....	..	....	†	....	....	†	....	....	....	Cuba.....	
†	†	....	..	....	....	....	....	....	....	....	....	.....	
....	..	*	..	....	....	*	....	....	....	....	....	Florida.....	
....	..	....	..	....	....	*	....	*	....	....	....	Jamaica	
....	..	†	..	....	....	†	....	†	....	†	....	Old Provid'ce	
†	..	*	†	....	....	....	....	....	....	....	....	Fernandina .	
....	..	*†	†	....	....	....	....	....	....	....	....	Fernandina .	
††	..	....	..	....	....	....	....	....	....	....	....	Rhode Island	
....	..	†	†	....	†	....	....	†	....	....	....	Cuba.....	
†	..	†	†	....	....	....	....	....	....	....	....	Fernandina .	
....	..	....	..	....	†	....	....	†	....	....	....	Cuba.....	
....	..	....	†	....	†	....	....	†	....	....	....	Cuba.....	
....	..	†*	..	....	....	....	....	....	....	....	....	Cape Fear...	
....	..	....	†	....	....	....	....	†	....	†	....	Yucatan.....	
....	..	....	..	....	†	....	....	†	....	....	....	Cuba.....	
....	..	....	†	....	....	....	....	....	....	*†	....	Fernandina .	Pliocene.
....	..	....	..	*	*	....	*	*	*	....	....	St. Vincent..	
....	..	....	..	*	*	*	*	*	*	....	....	Aspinwall...	
....	..	....	..	....	*	....	....	*	....	....	....	Aspinwall...	
....	..	....	..	....	*	*	....	*	*	....	....	Aspinwall...	

TABLE V. E.—*List of Gastropoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Genus NERITINA Lamarck.					
1056	N. reclivata Say	....	.....	.....	.....	St. Augustine.
1057	var. palmæ Dall	....	.....	.....	.....	Palma Sola..
1058	N. virginea Linné	....	.....	.....	.....	Tampa .....
1059	N. pupa Linné	....	.....	.....	.....	Charlotte H.
1060	N. viridis Lamarck	....	.....	.....	.....	No Name Key
	Section THEODOXUS Montfort.					
1061	N. Showalteri Lea	....	.....	.....	Fluv.	Alabama ....
	Family STOMATIIDÆ.					
	Genus STOMATELLA Lamarck.					
1062	S. picta Orbigny	....	.....	.....	.....	Florida Keys
	Superfamily ZYGOBRANCHIA.					
	Family HALIOTIDÆ.					
	Genus HALIOTIS Linné.					
1063	H. Pourtalesii Dall	....	.....	.....	200	Florida Str..
	? Family SCISSURELLIDÆ.					
	Genus SCISSURELLA Orbigny.					
1064	S. crispata Fleming	48	15	.....	$\frac{4}{790}$	Norway .....
1065	S. alta Watson	....	.....	.....	$\frac{159}{203}$	Florida Str..
1066	S.———	....	.....	.....	$\frac{234}{234}$	Fernandina .
	Family PLEUROTOMARIIDÆ.					
	Genus PLEUROTOMARIA Sowerby.					
1067	P. Quoyana Fischer and Bernardi ..	29 31 37	1 1*a–c* 5	42.0	$\frac{73}{130}$	Gulf of Mex.
1068	*P. Adansoniana* Crosse and Fischer.	30 31 32 37	— 3, 6 10 4	130.0	$\frac{69}{200}$	Guadalupe ..
	Family FISSURELLIDÆ.					
	Genus PUNCTURELLA Lowe.					
1069	P. circularis Dall	26	7, 7*b*	3.0	539	Gulf of Mex.
1070	P. trifolium Dall	26	8, 8*b*	7.0	640	Gulf of Mex.
1071	P. Watsoni Dall	....	.....	3.0	$\frac{188}{188}$	Gulf of Mex.
1072	P. profundi Jeffreys	....	.....	.....	$\frac{398}{398}$	Fernandina .
1073	P. agger Watson	....	.....	.....	$\frac{188}{188}$	Florida Str..
74	*P. eritmeta* Verrill	....	.....	5.0	1451	Rhode Island

TABLE V. E.—*List of Gastropoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	...	*	*	....	*	*	*	....	....	....	Jamaica.....	
....	..	....	..	....	....	....	*	....	....	....	....	.....	
....	..	...	..	....	*	*	*	*	....	....	....	Brazil.....	
....	..	....	..	....	*	*	....	*	....	....	....	Jamaica.....	
....	..	....	..	....	*	....	*	*	*	....	....	Barbados....	
....	..	..	..	....	....	*	....	....	....	....	....	.....	
....	..	....	..	....	*	....	....	*	....	....	....	St. Barts	
....	..	....	..	....	†	....	....	†	....	....	....	.....	
†	†	....	†	....	....	....	....	....	....	*†	....	Fernandina .	Pliocene.
....	..	....	..	†	....	....	....	†	....	....	....	Barbados....	
....	..	....	†	....	....	....	....	....	....	....	....	St. Augustine	
....	..	....	..	....	....	....	†	†	....	....	....	Barbados....	
....	..	....	..	....	....	....	....	†	....	....	....	Barbados....	Pliocene.?
....	..	....	..	....	†	....	....	†	....	....	....	Florida Str ..	
....	..	....	..	....	....	....	†	†	....	....	....	Yucatan.....	
....	..	....	..	....	....	....	†	†	....	....	....	Barbados....	
....	..	....	†	....	....	....	....	†	....	....	....	Culebra.....	
....	..	....	..	†	....	....	....	†	....	....	....	Culebra.....	
?†	..	....	..	....	....	....	....	....	....	....	....	.....	

TABLE V. E.—*List of Gastropoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
1075	Puncturella sportella Watson	....	.....	.....	330/430	N. lat. 24°...
1076	P. abyssicola Verrill	....	.....	10.0	1537	N. lat. 39°...
1077	P. erecta Dall	....	.....	7.0	107	Hatteras ....
	Subgenus **Fissurisepta** Seguenza.					
1078	F. triangulata Dall	....	.....	.....	300/350	Fernandina .
1079	F. rostrata Seguenza	....	.....	.....	.....	N. Atlantic ..
	Subgenus **Cranopsis** Adams.					
1080	C. asturiana Fischer	....	.....	.....	.....	N. Atlantic ..
	Genus EMARGINULA Lamarck.					
	Subgenus **Rimula** Defrance.					
1081	R. frenulata Dall	28	4	2.3	5/53	Hatteras ....
	Subgenus **Subemarginula** Blainville.					
1082	S. octoradiata Gmelin	....	.....	.....	.....	Tortugas ....
1083	S.———	....	.....	.....	300	Gulf of Mex.
	Subgenus **Emarginula** s. s.					
1084	E. tumida Sowerby	....	.....	.....	.....	Gulf of Mex.
1085	E. pumila A. Adams	....	.....	.....	10/16	Turtle Harb.
1086	E. cancellata Philippi	....	.....	.....	8/187	Britain .....
1087	E. compressa Cantraine	....	.....	.....	84/640	Portugal ....
	Genus FISSURELLA Bruguière.					
1088	F. alternata Say	....	.....	.....	1/50	Hatteras ....
1089	var. Sayi Dall	....	.....	.....	50/94	Florida Str..
1090	F. nodosa Born	....	.....	.....	.....	Tortugas ....
1091	F. Listeri Orbigny	...	.....	.....	.....	Indian Key..
1092	F. cayennensis Lamarck	....	.....	.....	.....	Cedar Keys..
1093	F. gemmulata Reeve	....	.....	.....	.....	Tortugas ....
	Subgenus **Glyphis** Carpenter.					
1094	G. barbadensis Gmelin	....	.. ...	.....	.....	Charlotte H.
1095	G. cancellata Sowerby	....	.....	.....	.....	Tortugas ....
1096	G. Tanneri Verrill	44	13,13*a*	16.0	124/42	Delaware....
1097	G.———	....	.....	.....	50/98	Key West....
1098	G.———	....	.....	.....	107	Hatteras ....
1099	G.———	....	.....	.....	2	Marco .....
1100	G. fluviana Dall	14	6, 6*a*	6.0	76/170	Florida Str..
	Genus FISSURELLIDEA Orbigny.					
1101	F. limatula Reeve	....	.....	.....	15/20	Cape Fear...

TABLE V. E.—*List of Gastropoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	....	..	†	....	....	....	†	....	....	....	Culebra.....	
†	..	....	..	....	....	....	....	....	....	....	....	.....	
....	..	†	..	....	....	....	....	....	....	....	....	.....	
....	..	....	†	....	....	....	†	†	....	....	....	Culebra.....	
....	..	....	†	....	....	....	....	....	....	†	....	Fernandina .	Pliocene.
....	..	†	†	....	†	....	....	†	....	†	....	St. Barts	Pliocene.
....	..	†	..	....	*	....	....	....	....	....	....	Tortugas....	
....	..	....	..	....	*	....	....	*	....	....	....	Barbados....	
....	..	....	..	....	....	....	†	†	....	....	....	Cuba.....	
....	..	....	..	....	*	....	....	*	....	....	....	Cuba.....	
....	..	....	..	....	*	....	....	*	....	....	....	Haiti	
....	..	†	..	....	†	....	....	*†	*	†*	....	Barbados....	
....	..	....	†	....	*	....	....	†	....	†	....	Barbados....	Pliocene.
....	..	*	..	*	*	*	....	*	*	....	....	Barbados....	Pliocene.
....	..	....	..	....	†	....	....	†	....	....	....	Barbados....	
....	..	....	..	....	*	....	....	*	*	....	....	Barbados....	
....	..	....	..	....	*	....	....	*	*	....	....	Barbados....	
....	..	....	..	....	....	*	....	†	*	....	....	St. Lucia....	Pliocene.
....	..	....	..	....	*	....	....	*	*	....	....	Guadalupe ..	
....	..	....	..	....	*	*	....	*	*	....	....	Barbados....	
....	..	....	..	....	*	....	....	*	....	....	....	St. Barts	
†	†	†	..	....	....	....	....	....	....	....	....	Hatteras	
....	..	....	..	....	†	....	....	†	....	....	....	Barbados....	
....	..	†	..	....	....	...	....	....	....	....	....	.....	
....	..	....	..	....	*	....	....	....	....	....	....	.....	
....	..	....	..	....	†	....	....	†	....	....	....	Barbados....	
....	..	*	..	....	*	....	....	†	....	....	....	Barbados....	

TABLE V. E.—*List of Gastropoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
1102	Fissurellidea fasciata Pfeiffer					Gulf of Mex.
1103	F. pustula Linné					C. Lookout.
	Genus CLYPIDELLA Swainson.					
1104	C. fascicularis Lamarck					Key West.
	Subclass ISOPLEURA.					
	Order POLYPLACOPHORA.					
	Superfamily EOCHITONIA.					
	Family LEPTOCHITONIDÆ.					
	Genus LEPTOCHITON Gray.					
1105	*L. alveolus* Sars				100/648	Arctic Sea.
1106	L. pergranatus Dall				114/1181	Gulf of Mex.
	Genus HANLEYIA Gray.					
1107	H. tropicalis Dall	26	8c.8d.	4.0	128	Sand Key.
1108	H. mendicaria Mighels				49/317	Arctic Sea.
	Family ISCHNOCHITONIDÆ.					
	Genus TRACHYDERMON Carpenter.					
1109	T. exaratus Sars	45	2, 2a		100/293	Norway.
1110	T. ruber Lowe	51	9		5/50	Arctic Sea.
	Genus CHÆTOPLEURA Shuttleworth.					
1111	C. apiculata Sowerby	51	10		0/30	Cape Cod.
1112	C. Janeirensis Gray					Key West.
	Genus ISCHNOCHITON Gray.					
1113	I. limaciformis Say					Key West.
1114	I. purpurascens C. B. Adams					Florida Keys.
1115	I. papillosus C. B. Adams					Tampa.
1116	I. ———					Turtle Harb.
1117	I. funiculatus Carpenter					Key West.
	Genus CERATOZONA Dall.					
1118	C. Guildingi Reeve					Jupiter Inlet
	Family LOPHYRIDÆ.					
	Genus CHITON s. s.					
1119	C. squamosus Linné					Indian Key.
1120	C. marmoratus Gmelin					Texas.

TABLE V. E.—*List of Gastropoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	....	..	....	*	*	....	*	....	....	.....	Cuba	
....	..	*	..	....	?	.....	....	*	....	....	.....	Barbados....	
....	..	....	..	....	*	.....	....	*	....	....	.....	Jamaica.....	
†	..	....	?	....	....	.....	....	....	....	†	†	Gulf of Me. ?	
....	..	....	..	....	†	†	....	†	....	....	.....	Dominica ...	
....	..	....	..	....	†	.....	....	.....	....	....	.....	Florida Str..	
†	..	†	..	....	....	.....	....	.....	....	†	.....	Hatteras	
...	..	†	†	....	....	.....	....	.....	....	†	.....	Fernandina..	
*	..	....	..	....	....	.....	....	.....	....	*	*	New York ...	
*	*	*	*	*	*	*	....	*	....	....	.....	Haiti.....	
....	..	....	..	....	*	.....	....	*	....	....	.....	Rio Janeiro..	
....	..	....	..	....	*	.....	....	*	....	....	*	St. Vincent .	
...	..	....	..	....	*	.....	*	*	*	....	.....	St. Thomas..	
...	..	..	..	....	*	*	....	*	....	....	.....	St. Thomas..	
....	..	....	..	....	*	.....	*	*	....	....	.....	Yucatan.....	
....	..	....	.	....	*	.....	....	*	....	....	.....	St. Thomas..	
....	..	....	..	*	....	.....	....	*	....	....	.....	Trinidad	
....	..	....	..	....	*	.....	....	*	*	....	.....	Santa Cruz .	
....	..	.....	..	....	....	.....	*	*	*	....	.....	Trinidad	

TABLE V. E.—*List of Gastropoda*—Continued.

Ser. No.	Name and authority for species.	Pl.	Figs.	Alt. or Lon.	Range in depth.	Northern extreme range.
	Genus TONICIA Gray.					
1121	T. Schrammii Shuttleworth	....	.....	.....	.....	Key West ...
	Family ACANTHOPLEURIDÆ.					
	Genus ACANTHOPLEURA Guilding.					
1122	A. picea Gmelin	....	.....	.....	.....	Charlotte H.
	Superfamily OPSICHITONIA.					
	Family PLACOPHORIDÆ.					
	Genus PLACOPHORA Gray (em.).					
1123	*P. atlantica* Verrill & Smith	45 63	1*a*, *b* 102*a*	32.0	111	Off Cape Cod.
	Family MOPALIIDÆ.					
	Genus ACANTHOCHITON Leach.					
1124	A. astriger Reeve	....	.....	.....	.....	Tortugas ....
1125	A. spiculosus Reeve	....	.....	.....	.....	Cedar Keys..
	Genus NOTOPLAX H. Adams.					
1126	N. floridanus Dall	....	.....	.....	.....	Cape Florida
	Family AMICULIDÆ.					
	Genus AMICULA Gray.					
1127	*A. vestita* Sowerby	63	103*a*	.....	$\frac{18}{88}$	Arctic Sea...

TABLE VI. F.—*List of Cephalopoda.*

	Class CEPHALOPODA.					
	Order DIBRANCHIATA.					
	Suborder OCTOPODA.					
	Family ARGONAUTIDÆ.					
	Genus ARGONAUTA Linné.					
1	A. argo L. var. americana Dall	43 64 67	1*a*–*b* 142*b* 1–3	.....	.....	N. lat. 43°...
	Suborder SEPIOPHORA.					
	Family SPIRULIDÆ.					
	Genus SPIRULA Lamarck.					
2	S. Peronii Lamarck	68	4	.....	.....	Cape Cod ...

TABLE V. E.—*List of Gastropoda*—Continued.

N. J.	Va.	Hat.	Ga.	East Fla.	Fla. Keys.	West Fla.	Tex.	West Ind.	Bermuda.	Eur.	West Am.	Southern extreme range.	Range in time.
....	..	....	..	....	*	....	....	*	*	....	....	Guadalupe ..	
....	..	....	..	....	*	*	....	*	*	....	....	New Grenada	
?	..	....	..	....	....	....	....	....	....	....	....	Rhode Island	
....	..	....	..	....	*	....	....	*	....	....	....	St. Thomas..	
....	..	....	..	....	*	*	....	*	....	....	....	Barbados....	
....	..	....	..	....	*	....	....	....	....	....	....	Key West ...	
†?	..	....	..	....	....	....	....	....	....	....	†	New York ?..	

TABLE VI. F.—*List of Cephalopoda.*

*	..	*	..	....	....	*	....	*	....	?	*?	Brazil?.....	
*?	*?	?*	*?	?*	*†	*†	....	†	*?	....	....	Tropics?	

SUMMARY OF THE TABLES.

The following table shows the relative proportions of the different groups included in the fauna and enumerated in the tables preceding:

	In the tables.	Extra limital.
Brachiopods	21	2
Pelecypods	487	13
Scaphopods	44	2
Pteropods	33	3
Gastropods	1,127	59
Cephalopods	2	.....
Total	1,714	79
Deduct extra-limital species	79	.....
Total enumerated species from Sandy Hook to Florida and the Rio Grande	1,635	.....

It may be added that, with but few exceptions, the enumerated extra-limital forms are likely, with further exploration, to be found in our region.

If all the Nudibranchiata, Heteropoda, and Cephalopoda were enumerated the total would be at least eighteen hundred forms.

It is probable that some of the species enumerated in the tables will hereafter prove to be synonymous with other enumerated species. But there is a reasonable prospect of the discovery of deep-water species, new to science or to the region, and of Antillean species which extend to the region of the Florida Keys which are not here enumerated, so that the loss from the above-mentioned cause will probably be more than made up numerically. This being the first attempt to enumerate the Molluscan fauna of the whole region, generalizations may well be deferred.

EXPLANATION OF THE PLATES.

NOTE.—The figures following the authority for the specific name denote the actual length in millimeters of the longest diameter of the figure, whether that be the height or the breadth, except where otherwise stated.

PLATE I.

FIG. 1. *Corbula Krebsiana* C. B. Adams; 6.1.
1 a. " "
1 b. " "
2. *Basterotia quadrata* Hinds; 10.0; left valve.
2 a. Same, hinge seen from above.
2 b. " " " " below.
3. *Corbula Knoxiana* C. B. Adams; 12.7; front.
3 a. " " back of left valve.
3 b. " "
3 c. " "
4. *Corbula disparilis* D'Orbigny; 9.0.
4 a. " "
4 b. " "
5. *Corbula Dietziana* C. B. Adams; 10.7.
5 a. " "
5 b. " "
6. *Corbula Kjoeriana* C. B. Adams; 12.0.
6 a. " "
6 b. " "
7. *Corbula cymella* Dall; 13.5.
7 a. " "

All the above, except figures 2 a, 2 b, and 4 a, 4 b, are drawn by W. H. Dall with the camera lucida from typical specimens of the describer in the museum at Amherst.

The following plates (I–XL) are from the Report on the Mollusca of the Blake Expedition, parts I and II, drawn by J. C. McConnell (except where otherwise stated) from the specimens. For the use of these plates we are indebted to Prof. Alex. Agassiz.

PLATE II.

FIG. 1 a, 1 b. *Verticordia* (*Euciroa*) *elegantissima* Dall; 13.25.
2, 2 a. *Halonympha claviculata* Dall; 12.0.
3 a, 3 b. *Cardiomya perrostrata* Dall; 8.0.
4 a, 4 b. *Verticordia* (*Haliris*) *Fischeriana* Dall; 10.0.
5 a–5 c. *Corbula Swiftiana* C. B. Adams, from type; 10.4.
6 a–6 d. *Corbula Chittyana* C. B. Adams, from type; 8.5.
7, 7 a–c. *Corbula Barrattiana* C. B. Adams, from types; 8.9.

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PLATE III.

FIG. 1. *Cuspidaria obesa* Lovèn, var.? 13.0.
2. *Cuspidaria Jeffreysi* Dall; 15.0.
3. *Cuspidaria arcuata* Dall; 12.5; inside.
4. Same, outside.
5. *Myonera limatula* Dall; 11.15.
6. *Cardiomya pectinata* Cpr., var. *beringensis* Leche [N. W. coast of America]; 6.0
7. *Myonera lamellifera* Dall; 12.5.
8. *Leiomya (Plectodon) granulata* Dall; 11.0.
9. *Cardiomya corpulenta* Dall; 14.0.
10. *Cardiomya striata* Jeffreys; 19.0.

PLATE IV.

FIG. 1 a. *Pecten (Amusium) Dalli* E. A. Smith; 62.0; inside of lower valve.
1 b. The same, inside of upper valve.
2. *Pecten (Pseudamusium) Sigsbeei* Dall; 11.5.
3. *Pecten (Propeamusium) Pourtalesianus* Dall, var. *marmoratus*; 13.5.
4 a–b. *Pecten (Pseudamusium) imbrifer* Lovèn; 12.5.
5 a–b. *Dimya argentea* Dall; 12.0.
6. *Cardium (antillarum* Orb. var.?) *ceramidum* Dall; 8.2.
7. *Cardium peramabilis* Dall; 12.5.
8. *Abra lioica* Dall; 8.1.
9 a–b. *Saxicava azaria* Dall; 25.0.

PLATE V.

FIG. 1, 2. *Pecten (Propeamusium) cancellatus* E. A. Smith; 26.0.
1 a. The same; a bit of the sculpture enlarged.
3. *Pecten (Propeamusium) Sayanus* Dall; 15.5.
4. *Pecten caurinus* Gould, young valve; 6.0.
5. *Pecten (Propeamusium) Holmesii* Dall; 12.0.
6. *Hinnites Adamsi* Dall; upper valve; 28.0.
7, 7 a. *Pecten (Propeamusium) alaskensis* Dall; 22.8; West America.
8. *Pecten (Pseudamusium) reticulus* Dall; 7.0.
9. *Pecten (Propeamusium) Sayanus* Dall; 15.5.
10. *Pecten (Pseudamusium) reticulus* Dall; 7.0.
11. *Pecten (Propeamusium) Holmesii* Dall; 12.0.
12. *Pecten (Propeamusium) Pourtalesianus* Dall; 13.5.

PLATE VI.

FIG. 1. *Magasella radiata* Dall; 6.1; N. W. America.
2. *Thecidium Barrettii* Davidson; 5.1.
3. *Modiola polita* V. and S.; 42.5.
4 a–c. *Terebratula Bartlettii* Dall; 40.0.
5. *Pecten (Janira) hemicyclicus* Ravenel; 4.0.
Inside view of upper shell of young fry.
6. *Terebratula incerta* Davidson; 11.5; interior.
6 a. The same; horizontal view of loop.
7, 8. *Modiolaria lateralis* Say; 7.5.
9, 10. *Arca ectocomata* Dall; 46.0.
11. *Tellina sybaritica* Dall; 7.0.
12. *Crassatella floridana* Dall; young shell; 11.0.

PLATE VII.

FIG. 1 a–b. *Leda* (*Neilonella*) *corpulenta* Dall; 9.5.
2. *Nucula crenulata* A. Adams; 6.0.
3 a–b. *Leda acuta* Conrad; 9.5.
4 a–b. *Gouldia cerina* C. B. Adams; 10.5; type.
5 a–b. *Astarte Smithii* Dall; 7.0.
6 a–b. *Astarte nana* (? Jeffreys) Dall; 8.2.
7 a–b. *Leda solidifacta* Dall; 12.5.
8. *Leda acuta* Conrad; 9.5.

PLATE VIII.

FIG. 1, a. *Tindaria cytherea* Dall; 8.6.
2. *Nucula* var. *obliterata* Dall; 6.0.
3, 3 a. *Arca polycyma* Dall; 9.75.
4, 4 a. *Macrodon asperula* Dall; 8.5.
5. *Arca pectunculoides*, var. *orbiculata*, Dall; 8.0.
6. *Leda* (*Saturnia*) *quadrangularis* Dall; 4.6.
7, 7 a. *Limopsis antillensis* Dall; 4.25.
8, 8 a. *Pandora* (*Clidiophora*) *carolinensis* Bush; 14.2.
9, 9 a. *Arca glomerula* Dall; 5.75.
10. *Cetoconcha margarita* Dall; 7.3.
11. *Leda Carpenteri* Dall; 10.5.
12, 12 a. *Leda vitrea*, var. *cerata*, Dall; 6.5.
13. *Vesicomya pilula* Dall; 2.6.

PLATE IX.

FIG. 1, 1 a. *Yoldia liorhina* Dall; 13.1.
2, 2 a. *Yoldia solenoides* Dall; 12.5.
3. *Leda Carpenteri* Dall; 10.5.
4. *Mangilia serga* Dall; 9.0.
5. *Mangilia citronella* Dall; 4.0.
6. *Mangilia Pourtalesii* Dall; 17.0.
7, 7 a. *Xylophaga abyssorum* Dall; 4.0.
8. *Conus Agassizii* Dall; 30.0; adult.
8 a. The same, young shell; 9.0.
9. *Daphnella leucophlegma* Dall; 10.25.
10. *Daphnella* (*Eubela*) *limacina* Dall; 11.0.

PLATE X.

FIG. 1. *Gymnobela Blakeana* Dall; 8.25.
2. *Gymnobela extensa* Dall; 12.25.
3. *Mangilia bandella* Dall; 9.37.
4. *Mangilia antonia* Dall; 5.75.
5. *Leucosyrinx Verrillii* Dall; 36.0.
6. *Drillia polytorta* Dall; 33.5.
7. *Drillia acestra* Dall; 19.0.
8. *Drillia albicoma* Dall; 25.7.
9. *Pleurotomella Emertonii* Verrill & Smith; 34.0.
10. *Daphnella reticulosa* Dall; 11.5.
11. *Daphnella sofia* Dall, outer lip imperfect; 8.0.
12. *Mangilia? scipio* Dall, outer lip imperfect; 14.0.

PLATE XI.

FIG. 1. *Drillia nucleata* Dall; 13.5.
2. *Drillia Verrillii* Dall; 5.5.
3. *Drillia lissotropis* Dall, young; 4.5.
4. *Drillia lissotropis* Dall, adult; 7.0.
5. *Drillia havanensis* Dall; 9.0.
6. *Drillia lithocolleta* Watson, young; 12.5.
7. *Drillia smirna* Dall; 15.0.
8. *Drillia oleacina* Dall; 10.0.
9. *Mangilia pelagia* Dall; 10.75.
10. *Leucosyrinx Sigsbeei* Dall; 25.5.
11. *Mangilia antonia* Dall, young; 7.0.
12. *Mangilia comatotropis* Dall; 6.0.
13. *Pleurotomella leucomata* Dall; 13.5.
14. *Mangilia Agassizii* V. & S.; young shell of var. *mexicana* Dall; 8.5.
15. *Mangilia quadrata* var. *monocingulata* Dall; 6.75.
16. *Mangilia quadrata* var.; 7.0.
17. *Mangilia peripla* Dall; 8.0.
18. *Drillia premorra* Dall; 9.5.

PLATE XII.

FIG. 1. *Daphnella morra* Dall; 5.75.
2. *Drillia pharcida* Dall; 9.5.
3. *Mangilia ? subsida* Dall; 13.0.
4. *Cythara cymella* Dall; 13.0.
5. *Genota mitrella* Dall; 12.5.
6. *Cythara Bartlettii* Dall, adult; 8.0.
7. *Mangilia elusiva* Dall; 9.25.
8. *Mangilia toreumata* Dall; 10.5.
9. *Pleurotomella filifera* Dall; 17.5.
10. *Glyphostoma gratula* Dall; 17.5.
11. *Drillia detecta* Dall; 11.75.
12. *Ancistrosyrinx radiata* Dall; 13.0.

PLATE XIII.

FIG. 1. *Drillia eucosmia* Dall; 19.0.
2. *Genota (Dolichotoma) viabrunnea* Dall; 38.0.
3. *Drillia haliostrephis* Dall; 20.0.
4. *Glyphostoma Gabbii* Dall, young; 9.5.
5. *Glyphostoma Gabbii* Dall, young; 9.5.
6. *Drillia pagodula* Dall; 13.5.
7. *Glyphostoma Gabbii* Dall, adult; 19.0.
8. *Glyphostoma Gabbii* Dall, young; 16.0.

PLATE XIV.

FIG. 1. *Amalthea benthophila* Dall, on spine of Echinoderm, viewed from above; 8.0.
1 a. *Amalthea benthophila* Dall, from the right; 8.0.
1 b. *Amalthea benthophila* Dall, from below; 8.0.
2. *Loripes compressa* Dall; 11.0.
3. *Capulus* (*Hyalorisia*) *galea* Dall, from below; 18.5.
3 a. *Capulus* (*Hyalorisia*) *galea* Dall, profile; 18.5.
4. *Pleurotomella Packardii* var. *Benedicti* V. & S.; 11.0.
5. *Cythara Bartlettii* Dall, nearly adult; 10.0.
6. *Glyphis fluviana* Dall, from below; 10.6.
6 a. *Glyphis fluviana* Dall, profile; 10.6.
7. *Daphnella corbicula* Dall; 11.2.
8. *Cythara Bartlettii* Dall, young; 10.0.
9. *Umbraculum bermudense* Mörch? young shell; 10.0.
10. *Umbraculum bermudense* Mörch? profile; 10.0.

PLATE XV.

FIG. 1. *Murex Pazi* Crosse, young shell; 7.5.
2. *Trophon? actinophorus* Dall; 17.5.
3. *Pteronotus tristichus* Dall; 15.5.
4. *Trophon lacunella* Dall; 41.0.
5. *Dolium* (*Eudolium*) *Crosseanum* Monterosato; 35.0.
6. *Mitra* (*Costellaria?*) *styria* Dall; 19.0.
7. *Typhis* (*Trubatsa*) *longicornis* Dall, young; 7.5.
8. *Mitra* (*Thala?*) *torticula* Dall; 12.2.
9. *Mangilia? exsculpta* Watson; 30.0.
10. *Fusus benthalis* Dall; 15.0.
11. *Fusus amiantus* Dall; 17.0.
12. *Nassarina Bushiæ* Dall; 9.0.

PLATE XVI.

FIG. 1. *Ocinebra* (*Favartia*) *cellulosa* Conrad, young; 12.0.
2. *Murex pomum* Gmelin, very young; 15.0.
3. *Murex Hidalgoi* Crosse; 23.0.
4. *Murex hystricina* Dall; 21.0.
5. *Coralliophila Deburghiæ* Reeve, young; 20.0.
6. *Coralliophila lactuca* Dall, young; 11.0.

PLATE XVII.

FIG. 1. *Actæon incisus* Dall; 9.0.
1 b. *Actæon incisus* Dall var., adolescent; 6.8.
2. *Actæon melampoides* Dall; 6.0.
3. *Utriculus vortex* Dall; 7.5.
4. *Utriculus Frieleï* Dall; 8.2.
5 *Actæon delicatus* Dall; 10.0.
6. *Bulla eburnea* Dall; 7.25.
7. *Atys? Sandersoni* Dall; 6.5.
8. *Utriculus* (*vortex* var.?) *domitus* Dall; 9.0.
9. *Sabatia bathymophila* Dall, adult; 16.5.
9 b. *Sabatia bathymophila* Dall, adolescent; 10.0.
10. *Scaphander Watsoni* Dall; 8.75.
11. *Bulla abyssicola* Dall; 12.75.
12. *Actæon Danaida* Dall; 11.0.

PLATE XVIII.

FIG. 1. *Scala hellenica* var. *Mörchiana* Dall; 6.87.
2. *Scala discobolaria* Dall; 6.5.
3. *Actæon perforatus* Dall; 7.75.
4. *Scala aurifila* Dall; 11.0.
5. *Niso interrupta* Sowerby var. *albida* Dall; 8.1.
6. *Niso interrupta* var. *albida* Dall, base; 3.5.
7. *Aclis nucleata* Dall; 9.3.
8. *Aclis lata* Dall; 5.5.
9. *Scala contorquata* Dall; 4.7.
10. *Scala polacia* Dall, aperture imperfect; 7.25.
11. *Scala formosissima* Jeffreys; 8.5. The aperture is a little distorted where it joins the body whorl.
11 b. *Scala belaurita* Dall; 8.3.
12. *Aclis egregia* Dall; 13.0.

PLATE XIX.

FIG. 1. *Rissoa precipitata* Dall; 4.0.
2. *Marginella seminula* Dall; 7.0.
3. *Marginella Watsoni* Dall; 9.5.
4. *Marginella fusina* Dall; 8.0.
5. *Marginella yucatecana* Dall; 5.62.
6. *Marginella succinea* Conrad; 12.0.
7. *Marginella torticula* Dall; 11.5.
8. *Columbella* (*Anachis*?) *Verrillii* Dall; 9.0.
9. *Pedicularia decussata* Gould, profile; 6.0.
9 b. *Pedicularia decussata*, young, showing spiral apex; 2.5.
10. *Rissoa xanthias* Watson, var. *acuticostata* Dall; 3.7.
10 b. *Eucosmia brevis* Orbigny; 2.0.
10 c. *Columbella* (*Anachis*) *amphissella* Dall; 4.0.
10 d. *Dalium solidum* Dall; 41.0.
11. *Eulima* (*Melanella*) *arcuata* C. B. Adams; 4.0.
11 b. *Leiostraca fusus* Dall; 13.5.
11 c. *Eulimella unifasciata* Forbes; 6.0.

PLATE XX.

FIG. 1. *Cerithiopsis Sigsbeeana* Dall; 10.5.
2. *Cerithiopsis Martensii* Dall; 11.25.
3. *Cerithiopsis crystallina* Dall; 16.0. Poor figure.
4. *Eumeta subulata* Montagu; 14.25.
5. *Cerithiopsis abrupta* Watson; 4.3
5 a. *Triforis triserialis* Dall; 8.25.
6. *Triforis cylindrella* Dall; 6.5.
6 a. *Triforis triserialis* Dall; 15.5.
7. *Mathilda yucatecana* Dall; 8.0.
8. *Triforis triserialis* var. *intermedia* Dall; 11.0.
9. *Triforis abrupta* Dall; 7.5.
10. *Triforis longissima* Dall; 26.0.
11. *Triforis bigemma* var. *hircus* Dall; 12.5.
11 b. *Triforis torticula* Dall; 10.5.
12. *Triforis colon* Dall; 12.0.
12 b. *Triforis inflata* Watson var. *ibex* Dall; 11.0.

PLATE XXI.

FIG. 1. *Solariella lacunella* Dall; base, 5.0.
1 a. *Solariella lacunella* Dall; profile, 4.5.
2. *Calliostoma sapidum* Dall; 5.0.
2 a. *Calliostoma echinatum* Dall; base, 4.75.
3. *Dillwynella modesta* Dall; top, alt. 3.0.
3 a. *Dillwynella modesta* Dall; profile, diam. 4.0.
4. *Calliostoma sapidum* Dall; base, 4.12.
5. *Calliostoma echinatum* Dall; 5.25.
6. *Umbonium Bairdii* Dall, young specimen; profile, alt. 4.0.
6 a. *Umbonium Bairdii* Dall; base, diam. 5.0.
7. *Solariella iris* Dall; profile, 5.0.
7 a. *Solariella iris* Dall; base, 5.5.
8. *Solariella lissocona* Dall; profile, 5.5.
8 a. *Solariella lissocona* Dall; base, 4.5.
9. *Solariella lubrica* Dall; profile, 4.0.
9 a. *Solariella lubrica* Dall; base, 3.25.
10. *Solariella scabriuscula* Dall; base, 4.0.
10 a. *Solariella scabriuscula* Dall; profile, 4.75.
11. *Lunatia fringilla* var. *perla* Dall; 6.5.
12. *Lunatia fringilla* Dall; 5.75.

PLATE XXII.

FIG. 1. *Turcicula imperialis* Dall, immature shell without the apical whorls; 13.0.
1 a. *Turcicula imperialis* Dall; base, 13.0.
2. *Basilissa alta* Watson, var. *delicatula* Dall; alt. 5.0.
2 a. *Basilissa alta* Watson, var. *delicatula* Dall; base, diam. 6.0.
3. *Calliostoma circumcinctum* Dall; diam. 6.9.
3 a. *Calliostoma circumcinctum* Dall; alt. 8.0.
4. *Gaza superba* Dall; profile, alt. 24.0.
4 a. *Gaza superba* Dall; base, diam. 35.5.
5. *Microgaza rotella* Dall; base, diam. 6.75.
5 a. *Microgaza rotella* Dall; profile, alt. 4.0.
6. *Fluxina brunnea* Dall; profile, alt. 10.75. The margins of the aperture are broken.
6 a. *Fluxina brunnea* Dall; base, diam. 15.5.
7. *Callogaza Watsoni* Dall; profile, alt. 7.75.
7 a. *Callogaza Watsoni* Dall; base, diam. 12.5.

PLATE XXIII.

FIG. 1. *Callogaza Watsoni* Dall, young; 8.0.
1 a. *Callogaza Watsoni* Dall, young; 8.0.
2. *Liotia variabilis* Dall; base, diam. 6.0. A calcareous foraminifer is attached to the periphery.
2 a. The same in profile, alt. 4.5.
3. *Solarium Sigsbeei* Dall; diam. 5.5. Margin of aperture defective.
3 a. The same in profile, alt. 2.3.
4. *Basilissa costulata* Watson var. *depressa* Dall; base, diam. 5.0.
4 a. *Basilissa costulata* Watson var. *depressa* Dall; profile, alt. 2.5.
5. *Fluxina discula* Dall; profile, alt. 3.0.
6. *Fluxina discula* Dall; base, 6.5.
7. *Calliostoma* (*Dentistyla*) *asperrimum* var. *dentiferum* Dall; base, 6.0
8. *Calliostoma* (*Dentistyla*) *asperrimum* var. *dentiferum* Dall; profile, ing tooth on the pillar; 7.5.

PLATE XXIV.

FIG. 1. *Calliostoma* (*Dentistyla*) *sericiflum* Dall; 4.2.
1 a. *Calliostoma* (*Dentistyla*) *sericiflum* Dall; base, 4.5.
2. *Callogaza Watsoni* Dall, base of young shell; 6.0.
2 a. *Callogaza Watsoni* Dall; 6.0.
3. *Calliostoma apicinum* Dall; alt. 7.5.
3 a. *Calliostoma apicinum* Dall; base, diam. 7.0.
4. *Calliostoma yucatecanum* Dall; 7.0.
4 a. *Calliostoma yucatecanum* Dall; base, 7.0.
5. *Liotia briareus* Dall; alt. 7.5.
5 a. *Liotia briareus* Dall; base, 9.0.
6. *Calliostoma roseolum* Dall; alt. 9.5.
6 a. *Calliostoma roseolum* Dall; base, 7.0.
7. *Leptothyra Philipiana* Dall; alt. 3.5.
7 a. *Leptothyra Philipiana* Dall; base, diam. 4.0. This species is named in honor of Dr. Philip P. Carpenter.

PLATE XXV.

FIG. 1. *Addisonia* (*lateralis* var. ?) *paradoxa* Dall; from above; 10.0.
1 b. *Addisonia* (*lateralis* var ?) *paradoxa* Dall, profile; alt. 4.0.
1 c. *Addisonia* (*lateralis* var. ?) *paradoxa* Dall; from below, showing soft parts.
1 d. *Addisonia* (*lateralis* var. ?) *paradoxa* Dall; showing animal crawling.
1 e. *Addisonia* (*lateralis* var. ?) *paradoxa* Dall; dentition, complete series across the radula.
2. *Cocculina Beanii* Dall; dentition, transverse series and one detached uncinus.
3. *Pectinodonta arcuata* Dall; dentition, pair of laterals.
3 a. *Pectinodonta arcuata* Dall; base of right lateral, with cusp broken off.
3 b. *Pectinodonta arcuata* Dall; shell in profile, twice natural size.
4. *Cocculina Beanii* Dall; in profile; 8.0.
5. *Cocculina Rathbuni* Dall; dentition, transverse series and two detached uncini.
6. *Lepetella tubicola* Verrill; dentition, transverse series.
7. *Cocculina Rathbuni* Dall, from above; 10.0.
7 a. *Cocculina Rathbuni* Dall, in profile; 10.0.
8. *Cocculina Beanii* Dall, from above; 8.0.

PLATE XXVI.

FIG. 1. *Dentalium sericatum* Dall; 13.0.
2. *Turbonilla interrupta* Totten; foot of animal from below, greatly magnified.
2 b. *Turbonilla interrupta* Totten; animal from above.
3. *Turritella yucatecana* Dall; 16.5.
4. *Siliquaria modesta* Dall; 26.0.
5. *Dentalium ceratum* Dall; 30.0.
6. *Bivonia? exserta* Dall, young in first stage; 11.0.
7. *Puncturella circularis* Dall; from below; 5.75.
7 b. *Puncturella circularis* Dall, profile; 5.75.
7 c. *Turbonilla curta* Dall; the aperture is imperfect; 8.3.
7 d. *Turbonilla belotheca* Dall; 14.0.
8. *Puncturella trifolium* Dall, from below; 14.0.
8 b. *Puncturella trifolium* Dall, profile; 14.0.
8 c. *Hanleyia tropicalis* Dall; medial valve; 4.0.
8 d. *Hanleyia tropicalis* Dall; posterior valve; 3.0.
9. *Dentalium ophiodon* Dall; 12.5.
10. *Mathilda barbadense* Dall; .2.

PLATE XXVII.

FIG. 1. *Dentalium laqueatum* Verrill; 29.0.
2. *Dentalium ceratum* Dall, v ry young; 7.0.
3. *Dentalium carduus* D ll; 16.0.
4. *Dentalium Gouldii* Dall, var. *obscurum;* 28.0.
5. *Cadulus quadridentatus* Dall, and outline of aperture; 10.0.
6. *Dentalium perlongum* Dall, and outline of apertu e; 80.0.
7. *Cadulus amiantus* Dall; 5.75.
8. *Cadulus lunula* Dall, and outline of aperture; 6.0.
9. *Cadulus æqualis* Dall, and outline of aperture; 15.0
10. *Dentalium callithrix* Dall; 25.0.
11. *Cadulus acus* Dall; 8.0.
12. *Dentalium ensiculus* Jeffreys, and outline of aperture; 20.0.
12 a. *Cadulus Watsoni* Dall, and outline of aperture; 13.0.
12 b. *Dentalium callipeplum* Dall; 36.0.
12 c. *Cadulus Agassizii* Dall, and outline of aperture; 9 0.
12 d. *Cadulus cucurbita* Dall, and outline of aperture, 4.0.

NOTE.—When the outline of the aperture is given it is on the same scale as the figure to which it refers, and its antero-posterior line is from left to right, or in the direction of a line drawn across the plate horizontally.

PLATE XXVIII.

FIG. 1. *Margarita erythrocoma* Dall; alt. 5.0.
2. *Calliostoma orion* Dall; alt. 4.5.
3. *Ethalia solida* Dall; bas , 2.75.
4. *Rimula frenulata* Dall; from above; 6.25.
5. *Ethalia solida* Dall, profile; 2.0.
6. *Fossarus* (*Gottoina*) *compactus* Dall, profile; 2.3.
7. *Ethalia reclusa* Dall, p ofile; alt. 1.0.
8. *Ethalia reclusa* Dall, base; 2.1.
9. *Cyclostrema pompholyx* Dall; 4.2.
10. *Fossarus* (*Gottoina*) *bellus* Dall; 3.5.
11. *Liotia miniata* Dall; 2.5.

PLATE XXIX.

FIG. 1. *Pleurotomaria Quoyana* F. & B. The animal sketched from life by J. H. Blake, redrawn by McConnell; 50.0.
2. *Lampusia gracile* Reeve; 25.5.
3. *Aurinia Gouldiana* Dall; 69.0.
4. *Fusus caloosaënsis* Heilprin; 60.0. In arranging the figures for the plates, by an error this figure was substituted for that of *F. timessus*, Dall. The figure of *F. timessus* will therefore appear in my Report on the Fossils of the Florida Pliocene.
5. *Æsopus Stearnsii* Tryon; 4.0.
6. *Terebra* (*Acus*) *benthalis* Dall; 21.0.
7. *Dolophanes Gabbii* Dall; 9.00.
8. *Mesostoma migrans* Dall; 9.25.

PLATE XXX.

FIG. 1. *Pleurotomaria Adansoniana* C. & F. Redrawn by McConnell from water-color sketch from life by J. H. Blake. The shell is merely indicated.
2. Anterior termination of gill in *P. Adansoniana*. *a*, osphradium; *b*, blood sinus (?). Only the inner series of gill lamellæ is here indicated. At this part of the gill they are narrow and pointed; farther back they become broader and more rounded at the distal end.
3. Posterior free termination of intestine (*o*) lying on the glandular (renal ?) organ, behind which in the commissure are two orifices on each side (*a*), with a short bunch of papillæ behind them and the flaps of the mantle with their papilose edges (*b*) corresponding to the edges of the sinus on each side.
4. Another specimen.
5. The first specimen crawling.
6. The head, viewed from above.

PLATE XXXI.

FIG. 1. *Pleurotomaria Quoyana* F. & B. Rhachidian and lateral teeth much magnified. 1 b, one of the outermost uncini; 1 c, one of the inner tricuspid uncini greatly magnified.
2. *Propilidium ancyloide* Forbes. Transverse row of teeth from above. 2 b, rhachidian and lateral teeth in profile; 2 c, jaw. All much magnified. Scandinavia and Britain.
3. *Pleurotomaria Adansoniana* C. & F. Separated teeth numbered in their order from the rhachis; *o*, rhachidian tooth.
4. General view of a single transverse row of teeth.
5. Same, a single tufted uncinus; $\frac{1}{1}\frac{2}{2}$.
6. Same, end of tufted uncinus; $\frac{2}{1}\frac{0}{0}$.
7. *Cocculina spinigera* Jeffreys. Penis from above magnified.
8. *Cocculina spinigera* Jeffreys. Head from above, showing tentacles and position of penis at the side of the right tentacle, magnified.
9. Rhachidian tooth of *C. spinigera*.
10. *Scutellina antillarum* Shuttleworth. Showing rhachidian tooth laterals and consolidated uncini of one side of a single transverse row of the radula; $\frac{1}{1}\frac{0}{0}$.
11. The same, a single separated uncinus.

PLATE XXXII.

FIG. 1. *Calliostoma* (*Eutrochus*) *cinctellum* Dall; 8.0.
2. *Pleurotoma periscelida* Dall; 40.5.
3. *Calliostoma* (*Eucasta*) *indiana* Dall; 7.6.
4. *Calliostoma* (*Eutrochus*) *cinctellum* Dall; 9.5.
5. *Calliostoma* (*Eucasta*) *indiana* Dall; 8.5.
6. *Liotia* (*Lippistes*) *acrilla* Dall; 4.3.
7. *Calliostoma* (*Eutrochus*) *Benedicti* Dall; 18.0.
8. *Margarita* (*Bathymophila*) *cuspira* Dall; alt. 5.75; max. diam. 7.0.
9. *Liotia* (*Lippistes*) *amabilis* Dall; 5.0.
10. *Pleurotomaria Adansoniana* C. & F.; 35.0.
11. *Liotia* (*Lippistes*) *acrilla* Dall; 4.3.
12. *Liotia* (*Lippistes*) *amabilis* Dall; 5.0.
12a. *Nassarina Grayi* Dall; 12.0.

PLATE XXXIII.

FIG. 1. *Calliostoma corbis* Dall; 5.0.
2. *Solarium peracutum* Dall; 17.5.
3. *Ovulactæon Meekii* Dall; apex 3.0.
4. *Ovulactæon Meekii* Dall; 5.5.
5. *Solarium peracutum* Dall; 17.5.
6. *Cyclostrema turbinum* Dall; 3.25.
7. *Euchelus guttarosæ* Dall; 5.00.
8. *Liotia Bairdii* Dall; 6.0.
9. *Leptothyra Linnei* Dall; 5.5.
10. *Calliostoma* (*Eutrochus*) *Sayanum* Dall; 40.0.
11. *Calliostoma* (*Eutrochus*) *Sayanum* Dall; 37.0.

PLATE XXXIV.

These figures are from drawings by the late Dr. William Stimpson.

FIG. 1. *Olivella mutica* Say. *a–g*, varieties of form and color, natural size; *h*, operculum, natural size; *i*, *l*, operculum outside and inside, magnified; *m*, animal crawling; *n*, head, showing absence of eyes and tentacles; *o*, section of oral aperture magnified; *p*, penis; *r*, section of shell showing absorption of internal walls.
2. *Olivella mutica* Say; dentition.
3. *Purpura hæmastoma* Linné var. *floridana* Conrad. *c*, animal from below, natural size; *d*, head and verge from above.
4. *Purpura hæmastoma* Linné var. *floridana* Conrad; dentition.
5. *Scaphella junonia* Hvass. *b*, shell one-half natural size; *c*, sculpture of early whorls; *d*, nucleus; *e*, section of shell.
6. *Volutomitra grönlandica* Beck. Young shell and magnified nucleus. Cape Cod northward.
7. *Volutomitra grönlandica* Beck. Rhachidian tooth; *a*, from above; *b*, in profile.
8. *Oliva literata* Lamarck. *a*, animal crawling, ⅔; *b*, tentacula and eyes; *c*, soft parts removed from the shell, showing (*f*) foot, (*g*) propodium, (*h*) respiratory siphon, (*i*) vent, (*l*) posterior filament of mantle, (*m*) mantle raised up, (*n*) verge, (*o*) gill; *d*, section of muzzle showing proboscis extruded; *e*, gill and sensory organ (osphradium).
8♀. *Oliva literata* Lamarck. Dentition taken from a female specimen.

PLATE XXXV.

FIG. 1. *Mitromorpha biplicata* Dall; 7.0.
2. *Aurinia robusta* Dall; 119.0.
3. *Columbella* (*Astyris*) *profundi* Dall; 8.0.
4. *Cancellaria* (*Trigonostoma*) *Agassizi* Dall; 13.5.
5. *Fusus eucosmius* Dall; 85.0.
6. *Benthobia Tryoni* Dall; 13.0.
7. *Fusus halistreptus* Dall; 80.0.
8. *Marginella cassis* Dall; 15.0.
9. *Columbella* (*Astyris*) *diaphana* Verrill; 9.0.
10. *Conomitra Blakeana* var. *lævior* Dall; 9.75.
11. *Liomesus? Stimpsoni* Dall; 32.5.
12. *Eudolium Verrillii* Dall; 32.0.
12 a. *Sipho* (*Ptychosalpinx?*) *globulus* Dall; 31.0.

PLATE XXXVI.

FIG. 1. *Drillia alesidota* var. *macilenta* Dall; 36.5.
2. *Lampusia pharcida* Dall; 23.6.
3. *Drillia* (*Cymatosyrinx*) *Moseri* Dall; 30.0.
4. *Daphnella pompholyx* Dall; 12.5.
5. *Leucosyrinx tenoceras* Dall; 60.0.
6. *Pleurotomella Edgariana* Dall; 58.0.
7. *Mesorhytis Meekiana* Dall; 15.5.
8. *Terebra nassula* Dall; 55.0.
9. *Drillia* (*Cymatosyrinx*) *centimata* Dall; 22.5.
10. *Drillia* (*Cymatosyrinx*) *æpynota* Dall; 15.0.
11. *Cordieria Rouaultii* Dall; 13.6.

PLATE XXXVII.

FIG. 1. *Cancellaria* (*Trigonostoma*) *Smithii* Dall; 10.5.
2. *Calliostoma aurora* Dall; lat. 26.5.
3. *Ringicula nitida* Verrill; 7.5.
4. *Pleurotomaria* (*Entemnotrochus*) *Adansoniana* Crosse and Fischer; major diam. 88.0.
5. *Pleurotomaria* (*Perotrochus*) *Quoyana* Fischer and Bernardi; major diam. 48.0.
6. *Gaza Fischeri* Dall, enlarged three-fifths; diameter of specimen, 25.0.

PLATE XXXVIII.

FIG. 1. *Pleurotoma* (*Leucosyrinx*) *subgrundifera* Dall; 30.0.
2. *Marginella Watsoni* Dall; 9.5.
3. *Pleurotoma* (*Anoistrosyrinx*) *elegans* Dall; 27.0.
4. *Vermetus* (*Petaloconchus*) *erectus* Dall; 25.0.
5. *Typhis* (*Trubatsa*) *longicornis* Dall, adult; 23.0.
6. *Leptothyra induta* Watson var. *albida* Dall; 7.0.
7. *Mitra Swainsoni* Broderip var. *antillensis* Dall; 80.0.

PLATE XXXIX.

FIG. 1. *Bushia elegans* Dall; 12.5.
2. *Cetoconcha bulla* Dall; interior of left valve; 13.0.
3. *Cetomya elongata* Dall; left valve; 22.5.
4. *Verticordia perversa* Dall; 5.0.
5. *Cetoconcha bulla* Dall; left valve; 13.0.
6. *Terebratula cubensis* Pourtalès, side view of shell adhering to a bit of coral, natural size.
7. *Verticordia* (*Euciroa*) *elegantissima* Dall; left valve of old individual, natural size.
8. *Terebratulina Cailleti* Crosse, young specimen considerably magnified.
9. *Eudesia floridana* Pourtalès; natural size.
10. *Terebratula cubensis* Pourtalès; interior of hæmal valve enlarged about one-fourth, from an original drawing by W. H. Dall.
11. *Eudesia floridana* Pourtalès; interior of hæmal valve, natural size, from an original drawing by W. H. Dall.

PLATE XL.

FIG. 1. *Pecten phrygium* Dall; 36.5.
2. *Cuspidaria microrhina* Dall, dorsal view of right valve, natural size
3. The same, side view.
4. *Cardium* (*Fulvia*?) *peramabilis* Dall; ¾.
5. *Callocardia* (*Vesicomya*) *venusta* Dall; 19.0.
6. *Amusium Dalli* E. A. Smith, natural size.
7. *Meiocardia Agassizii* Dall; 22.0.
8. *Tindaria amabilis* Dall; 15.0.

PLATE XLI.

FIG. 1. *Mangilia oxytata* Bush.
2. *Mangilia lanceolata* Adams var. *psila* Bush.
3. *Mangilia melanitica* Dall var. *oxia* Bush.
3 a. *Mangilia melanitica* Dall var.
4. *Mangilia atrostyla* Dall.
4 a. *Mangilia atrostyla* Dall.
5. *Nassarina glypta* Bush.
5 a. *Nassarina glypta* Bush.
6. *Triforis turris-thomæ* Orbigny.
7. *Adeorbis supranitidus* Wood.
7 a. *Adeorbis supranitidus* Wood.
8. *Scala teres* Bush.
9. *Eulimella*? *engonia* var. *teres* Bush.
10. *Niso interrupta* Sby. var. *ægleës* Bush.
11. *Volvula acuta* Orbigny.
12. *Volvula oxytata* Bush.
13. *Tornatina Candei* Orbigny.
14. *Cylichnella bidentata* Orbigny.
15. *Retusa cælata* Bush.
16. *Philine sagra* Orbigny.
16 a. *Philine sagra* Orbigny.
17. *Actæon punctostriatus* Adams, var.
18. *Dentalium leptum* Bush.
18 a. *Dentalium leptum* Bush.
19. *Cadulus carolinensis* Bush.
20. *Cadulus quadridentatus* var. *incisus* Bush.
21. *Cuspidaria ornatissima* Orbigny.

The drawings for this plate were made by Miss Bush, and lent by Professor Verrill for use in the present publication. They first appeared in the Transactions of the Connecticut Academy of Sciences (vol. vi, part ii, plate xiv).

PLATE XLII.

FIG. 1. *Pteronotus phaneus* Dall; 17.0.
2. *Pseudamusium strigillatum* Dall; 10.0.
3. *Euplewra Stimpsoni* Dall; 12.0.
4. *Crassatella floridana* Dall; 50.0.
5. *Benthonella gaza* Dall; 10.0.
6. *Marginella cineracea* Dall; 13.0.
7. *Mitra Bairdii* Dall; 35.0.
8. *Scala babylonia* Dall; 30.0.
9. *Pecten effluens* Dall; 26.0.
10. *Peristichia toreta* Dall; 10.75.
11. *Cyclostrema cistronium* Dall; max. diam, 2.0.

The figures on this plate are unpublished and were drawn for the U. S. Fish Commission by J. C. McConnell.

PLATE XLIII.

FIG. 1. *Argonauta argo* Lin. var. *americana* Dall. The animal slightly contracted by alcohol.
1 a. The same, the shell from in front.
1 b. The same, from the side.
2. *Abralia megaptera* Verrill, front view of one of the sessile arms, ½.
3. *Cavolinia* (*Diacria*?) *Hargeri* Verrill. This is referred by Pelseneer to the young of some indeterminate *Cavolinia*, but the large size of the shell and the absence of intermediate specimens would seem to render this decision questionable.
4. *Atlanta Peronii* Lesueur, side view.
4 a. The same, front view.
5. *Heterodoris robusta* V. and E., dorsal view.
5 a. The same, ventral view.
6. *Doris complanata* Verrill and Emerton, dorsal view.
7. *Koonsia obesa* Verrill, somewhat distorted by alcohol; ½.
8. *Cæcum Cooperi* Smith: anterior part of shell showing animal extended, enlarged about 10 diameters.

This plate appeared in the Transactions of the Connecticut Academy of Sciences (vol. vi, pl. xxviii). The figures were drawn for the U. S. Fish Commission by Mr. J. H. Emerton.

PLATE XLIV.

FIG. 1. *Coralliophila Deburghiæ* Reeve var. *Lintoni* Verrill; 27.0.
2. *Eudolium Crosseanum* Monterosato; 60.0.
2 a. The same, part of the odontophore, $\frac{2}{1}$.
2 b. The same, animal partly contracted by alcohol.
3. *Lunatia levicula* Verrill; 39.0.
4. *Marginella* (*apicina* var.?) *borealis* Verrill 11.0.
5. *Adeorbis*? *olivaceus* Verrill; 4.0.
6. *Capulus hungaricus* Linné; 20.0.
7. *Pleurotomella Packardi* Verrill; soft parts.
8. *Mangilia comatotropis* Dall.
9. *Choristes elegans* Carpenter, young shell, enlarged.
9 a. Top view of a somewhat older specimen same scale.
9 b. Basal view of a still older specimen, same scale.
10. *Addisonia paradoxa* Dall, part of the radula.
11. The same, shell in profile, ½.
11 a. The same, dorsal view of the same specimen.
11 b. The same, the animal, viewed from below, in shell ½.
12. *Cocculina Beanii* Dall, ½.
13. *Glyphis Tanneri* Verrill, top; 35.0.
13 a. " " " profile; alt. 17.0.
14. *Solariella Ottoi* Philippi, part of one side of the radula.
15. *Utriculus vortex* Dall; ½.
16. *Mangilia cerina* Kurtz & Stimpson, soft parts, from life, enlarged about 8 diameters.
16 a. *Mangilia cerina* K. & S., dorsal view of head and foot more extended.

This plate first appeared in the Transactions of the Connecticut Academy of Sciences (vol. vi, pl. xxix). The figures were drawn for the U. S. Fish Commission, by J. H. Emerton, under the direction of Prof. A. E. Verrill.

PLATE XLV.

FIG. 1. *Placophora atlantica* Verrill & Smith; nat. size.
1 a. The same, dorsal view.
1 b. The same, views of detached valves, two diameters.
2. *Trachydermon exaratus* Sars; 20.0.
2 a. The same, ventral view.
2 *b*. Anterior valve, 4.
3. *Cuspidaria lamellosa* Sars; 7.3.
4. *Lyonsia? arata* Verrill & Smith; 36.0.
5, 6. The same; views of the beak and hinge of two specimens to show variations; 2.
7. *Lyonsiella* (*insculpta* Jeffreys var.?) *gemma* Verrill; 4.5. Interior of left valve.
8. The same; exterior of the right valve of a larger specimen.
9. *Verticordia* (*Trigonulina*) *ornata* Orbigny; 3.0.
9 a. The same, view of the interior.
10. *Diplodonta turgida* Verrill & Smith; 25.0.
11. The same, interior of a somewhat smaller valve.
12. *Modiola polita* Verrill & Smith; 33.0.
13. *Tellimya ferruginosa* Montagu; 8.5, with the animal extended.
14. *Leda pernula* Müller; 17.0. Halifax to Martha's Vineyard, on the American coast; Europe.
14 a. The same, view of the hinge.
15. *Leda acuta* Conrad; 12.0. Side view.
16. *Idas argenteus* Jeffreys, var. *lamellosus* Verrill & Smith; 4.
16 a. The same, interior of the right valve; 4.

This plate first appeared in the Transactions of the Connecticut Academy of Sciences (vol. vi., pl. XXX). The figures were drawn, under the direction of Prof. A. E. Verrill, for the U. S. Fish Commission, by J. H. Emerton.

PLATE XLVI.

FIG. 1. *Purpura hæmastoma* Linné var. *floridana* Conrad, operculum, inside view, nat. size.
1 a. The same, outside view.
2 *a*. The same, a view of the shell, nat. size.
2 *b*. The same, from the opposite side. [The preceding figures were drawn by the late Dr. William Stimpson.]
3. *Pleurotomella chariessa* Watson; 52.0.
4. *Pleurotomella tincta* Verrill; 22.0.
5. *Pleurotomella Frielei* Verrill; 22.0.
6. *Pleurotomella vitrea* Verrill; 8.0.
7. *Pleurotomella Lottæ* Verrill; 11.5.
8. *Pleurotomella* (*Gymnobela*) *Blakeana* Dall; 8.0.
9. *Admete? nodosa* Verrill; 12.0.
10. *Jumala brychia* Verrill; 41.0.
10 a. The same, operculum.
11. *Laxispira nitida* Verrill; 5.0.
12. *Omalaxis nobilis* Verrill; diam. 11.0, alt. 3.0.
13. *Pleurobranchus americanus* Verrill; 13.5.
14. *Coleophysis? eburnea* Verrill; 6.0.
15. *Actæon melampoides* Dall; 8.0.

PLATE XLVI—Continued

FIG. 16. *Dentalium candidum* Jeffreys; 75.0;
17. The same, young shell; 35.0.
18. *Dentalium laqueatum* Verrill; 45.0.
19. *Cadulus spectabilis* Verrill; 22.0.
20. *Cadulus grandis* Verrill; 12.5.
21. *Pseudamusium undatum* Verrill & Smith; 19.0.
22. *Cryptodon grandis* Verrill; 21.0.
23. *Barbatia* (*Macrodon*?) *profundicola* Verrill; 12.0.
23. The same, interior of left valve.
24. *Discinisca atlantica* King; 6.2; view from above, the setæ projecting from the shell.

With the exceptions mentioned, the figures above enumerated first appeared in the Transactions of the Connecticut Academy of Sciences (vol. vi, pl. xliv). They were drawn under the supervision of Prof. A. E. Verrill, for the U. S. Fish Commission, by Messrs. J. H. Blake and J. H. Emerton.

PLATE XLVII.

FIG. 1. *Melampus flavus* Gmelin; 12.0.
2. *Melampus floridanus* Shuttleworth; 7.5.
3. *Melampus coffeus* Linné, nat. size.
4. *Pedipes elongatus* Dall; 4.0.
5. *Tralia pusilla* Gmelin; 11.0.
6. *Pedipes unisulcatus* Cooper, west coast of America. Introduced for comparison.
7. *Detracia bulloides* Montagu; 11.0.
8. *Auriculastrum pellucens* Menke; 16.0. In old specimens the peristome becomes rather thick.
9. *Melampus lineatus* Say; nat. size.
10. *Sayella Crosseana* Dall; 2.5.
11. *Sayella Hemphillii* Dall; 3.75.
12. *Melampus lineatus* Say, typical or banded form, nat. size.
13. *Leuconia bidentata* Montagu.
14. *Blauneria heteroclita* Montagu.
15. *Pedipes liratus* Binney; 3.3. This is extremely similar to *P. mirabilis* Muhlfeldt, the common species of the Antilles, Bermuda, and the Florida region. It is introduced for comparison.
16. *Melampus olivaceus* Carpenter, nat. size. West America.
17. *Pedipes mirabilis* Muhlfeldt, var. *naticoides* Stearns; 3.6.

Figures 4, 6, 8, 10, 11 were drawn by J. C. McConnell, and have appeared in the Proceedings of the National Museum; Fig. 17 was drawn by Prof. E. S. Morse; the remainder are extracted from Binney's Land and Fresh Water Shells of North America, published by the Smithsonian Institution, and were furnished by the Institution for this publication.

PLATE XLVIII.

FIG. 1. *Drillia thea* Dall; 15.0.
2. *Oscilla nivea* Mörch; 8.5.
3. *Mangilia limonitella* Dall; 6.75.
4. *Turbonilla* (*Parthenia*) *cedrosa* Dall; 5.5. The aperture is a little broken.
5. *Mitra floridana* Dall; 6.0.
6. *Phos parvus* Ads. var. *intricatus* Dall; 13.2.
7. *Drillia leucocyma* Dall; 7.5. The last whorl of this specimen has been repaired after fracture.
8. Teeth of *Capulus hungaricus* Linné, much enlarged.
9. *Sipho pygmæus* Gould, showing soft parts.
10. *Tachyrhynchus erosa* Couthouy?, showing animal and part of the shell, enlarged. Cape Cod northward, West America, Arctic Seas.
11. *Liostraca Hemphillii* Dall; 3.0.
12. *Crepidula* (*Janacus*) *unguiformis* Lamarck, dentition much enlarged.
13. *Nassa trivittata* Say, twice nat. size, showing animal as if crawling.
14. *Limacina helicina* Phipps; dentition, enlarged.
15. *Scissurella crispata* Fleming, showing animal, from a sketch by Lucas Barrett; 4.0.
16. *Crepidula fornicata* Lamarck, from below, showing soft parts; 20.0.

Figures 1–7 and 11 were drawn by J. C. McConnell and first appeared in the Proceedings of the U. S. National Museum. Figures 9, 10, 13, and 16 were loaned by the U. S. Fish Commission and are now first published. They were drawn by Prof. A. E. Verrill. Figures 8, 12, 14, and 15 have appeared in the publications of the British Museum and Woodward's Manual, and were loaned by the Smithsonian Institution.

PLATE XLIX.

FIG. 1. *Terebratulina caputserpentis* Linné, showing interior of hæmal valve somewhat enlarged. *T. septentrionalis* Couthouy (see plate lxix) appears to be an American race of this species.
2. The same, showing soft parts.
3. *Platidia seminula* Philippi (*P. anomioides* Scacchi); interior of hæmal valve, much enlarged.
4. The same, showing soft parts; 4.5.
5. *Yoldia limatula* Say, showing animal; †.
6. *Parastarte triquetra* Conrad; 5.0. Exterior.
7. The same, interior of right valve.
8. The same, interior of left valve.
9. *Mya arenaria* Linné with the left valve, and mantle-lobe and part of the siphons removed, showing anatomical features: *a*, anterior adductor muscle; *a'* posterior adductor; *b*, visceral mass or body: *cl*, cloaca; *e*, epidermis of siphons; *f*, foot; *g*, gills; *h*, heart; *m*, cut edge of the mantle; *o*, mouth; *s*, *s'*, siphons; *t*, labial palpi; *v*, vent; *u*, the umbo of the shell; *p. o.*, pedal orifice of the mantle; *r*, rectum. From a drawing by Miss Hume.
10. *Lyonsia hyalina* Conrad, showing animal extended.
11. *Thecidium mediterraneum* Sowerby; 5.5; interior of hæmal valve showing soft parts.

Figure 10 is loaned by the U. S. Fish Commission. Figures 6, 7, and 8 are taken from the Proceedings of the U. S. National Museum. The others are from the British Museum series, and were loaned by the Smithsonian Institution.

PLATE L.

FIG. 1. *Purpura lapillus* Linné.
2. The same; a younger specimen.
3. The same; ovicapsules enlarged about four times.
4. *Chrysodomus* (*Sipho*) *pygmæus* Gould.
5. *Scala multistriata* Say.
6. *Urosalpinx cinereus* Say.
7. *Nassa trivittata* Say.
8. *Nassa vibex* Say.
9. *Nassa* (*Ilyanassa*) *obsoleta* Say.
10. *Scala Sayana* Dall; 17.0.
11. *Eupleura caudata* Say, small northern form.
12. *Anachis avara* Say, variety.
13. *Astyris pura*? Verrill; (*A. zonalis* Linsley, non Verrill).
14. *Mangilia*? *plicosa* C. B. Adams.
15. *Mangilia*? *bicarinata* Couthouy.
16. *Astyris lunata* Say.
17. *Bela harpularia* Couthouy.
18. *Lunatia triseriata* Say; young.
19. The same; older specimen.
20. *Lunatia immaculata* Totten.
21. *Natica pusilla* Say.
22. *Cœcum pulchellum* Stimpson.
23. *Crepidula fornicata* Lamarck.
24. The same; young specimen.
25. *Crepidula convexa* Say.
26. *Crepidula* (*unguiformis* Lam. var.?) *plana* Say.
27. *Crucibulum striatum* Say; profile.
28. The same, from below.

Except where otherwise indicated the figures are of natural size. These figures were drawn by E. S. Morse, were first published in Mr. W. G. Binney's edition of Gould's Invertebrata of Massachusetts, and were loaned on the present occasion by the U. S. Fish Commission.

PLATE LI.

FIG. 1. *Lunatia heros* Say, showing animal crawling.
2. *Acmæa testudinalis* Linné, profile.
3. The same, from below.
4. *Vermicularia spirata* Philippi.
5. *Litorina palliata* Say.
6. *Litorina rudis* Maton.
7. *Acmæa testudinalis* var. *alveus* Couthouy, profile.
8. The same from below.
9. *Trachydermon ruber* Linné.
10. *Chaetopleura apiculata* Say.
11. *Lunatia heros* Say.
12. *Neverita duplicata* Say.

The same remarks apply to these figures as to those included in Plates L, LII, and LIII.

PLATE LII.

FIG. 1. *Eumeta subulata* Montagu; (*Cerithiopsis Emersonii* Ad.).
2. *Cerithiopsis Greenii* C. B. Adams.
3. *Triforis adversa* var. *nigrocincta* Adams.
4. *Bittium alternatum* Say; (*B. nigrum* Totten).
5. *Scila terebralis* C. B. Adams.
6. *Turbonilla elegans* Verrill.
7. *Odostomia bisuturalis* Say.
8. *Odostomia trifida* Totten.
9. *Alexia myosotis* Draparnaud, young shell.
10. *Odostomia seminuda.*
11. *Odostomia impressa* Say.
12. *Rissoa* (*Onoba*) *aculeus* Gould.
13. *Syrnola producta* Adams.
14. *Eulima intermedia* Cantraine (*E. oleacea* K. and S.).
15. *Syrnola fusca* Adams.
16. *Solariella obscura* Couthouy.
17. *Rissoa* (*Cingula*) *minuta* Totten.
18. *Skenea planorbis* Fabricius.
19. *Lacuna vincta* Montagu.
20. *Haminea solitaria* Say.
21. *Cylichna alba* Brown.
22. *Actæon puncto striatus* Adams.
23. *Cylichnella oryza* Stimpson.
24. *Diaphana debilis* Gould.
25, 26. *Utriculus pertenuis* Mighels, a series showing variations.
27. *Tornatina canaliculata* Say; 5.0.

Figures 6, 25, and 26 were loaned by the U. S. Fish Commission; and were drawn by Prof. A. E. Verrill. See remarks under Plate L.

PLATE LIII.

FIG. 1. *Anomia simplex* Orbigny, side view.
2. The same, from below.
3. *Siliqua costata* Say.
4. *Ensis americana* Gould.
5. *Anomia aculeata* Gmelin, from above.
6. The same, from below.
7. The same, sculpture magnified.
8. The same, smooth variety.
9. *Modiolaria corrugata* Stimpson.
10. *Crenella glandula* Totten.
11. *Pecten irradians* Lamarck, typical form.

For remarks see note to Plate L.

PLATE LIV.

FIG. 1. *Modiola plicatula* Lamarck, typical form.
2. *Modiolaria nigra* Gray.
3. *Mytilus edulis* Linné, rayed color-variety.
4. *Modiola modiolus* Linné.

For remarks see note to Plate L.

PLATE LV.

FIG. 1. *Tellina tenera* Say, showing extended animal.
2. *Mya arenaria* Linné, showing extended animal.
3. *Tagelus gibbus* Spengler, showing extended animal.
4. *Ensis americanus* Gould, showing extended animal.
5. The same, terminal siphonal papillæ.
6. *Teredo navalis* Linné, removed from burrow, showing external soft parts, shell, and pallets.
7. *Venus mercenaria* Linné, showing extended animal.

These figures were loaned by the U. S. Fish Commission. They first appeared in the first Annual Report of the Commission in Prof. A. E. Verrill's report on the invertebrate animals of Vineyard Sound, and were drawn from life by Professor Verrill.

PLATE LVI.

FIG. 1. *Yoldia limatula* Say.
2. *Arca transversa* Say.
3. *Tagelus gibbus* Spengler.
4. *Nucula proxima* Say.
5. *Tagelus divisus* Spengler.
6. *Macoma baltica* Linné, var. *fusca* Adams.
7. *Kellia planulata* Stimpson, enlarged about twice nat. size.
8. *Nucula delphinodonta* Mighels, enlarged to about twice nat. size.
9. *Yoldia sapotilla* Gould.
10. *Macoma tenta* Say, typical form.
11. *Gemma purpurea* H. C. Lea (*G. gemma* Totten), identified from Lea's type.
12. *Tellina tenella* Verrill.
13. *Tellina tenera* Say.
14. *Cumingia tellinoides* Conrad.
15. *Cytherea convexa* Say.
16. *Arca* (*Argina*) *pexata* Say.

For remarks see note under Plate L. Fig. 12 was drawn by Prof. A. E. Verrill.

PLATE LVII.

FIG. 1. *Cyprina islandica* Linné.
2. *Mactra solidissima* Dillwyn.

For remarks see note under Plate L.

PLATE LVIII.

FIG. 1. *Astarte undata* Gould.
2. *Cryptodon Gouldii* Philippi.
3. *Solenomya velum* Say.
4. *Astarte quadrans* Gould, Long Island Sound northward to Nova Scotia.
5. *Cardium pinnulatum* Conrad.
6. *Divaricella dentata* Wood.
7. *Astarte castanea* Say.
8. *Liocardium Mortoni* Conrad, showing extended animal.
9. *Venericardia borealis* Conrad, typical form.
10. *Venericardia borealis* var. *novangliæ* Morse.
11. *Eriphyla lunulata* Conrad, enlarged.
12. *Cryptodon obesus* Verrill, greatly enlarged.
13. *Eriphyla lunulata* Conrad, natural size.
14. *Lucina filosa* Stimpson.

See Plate L for remarks. Figures 1, 11, and 12 were drawn by Prof. A. E. Verrill.

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PLATE LV.

FIG. 1. *Tellina tenera* Say, showing extended animal.
2. *Mya arenaria* Linné, showing extended animal.
3. *Tagelus gibbus* Spengler, showing extended animal.
4. *Ensis americanus* Gould, showing extended animal.
5. The same, terminal siphonal papillæ.
6. *Teredo navalis* Linné, removed from burrow, showing external soft parts, shell, and pallets.
7. *Venus mercenaria* Linné, showing extended animal.

These figures were loaned by the U. S. Fish Commission. They first appeared in the first Annual Report of the Commission in Prof. A. E. Verrill's report on the invertebrate animals of Vineyard Sound, and were drawn from life by Professor Verrill.

PLATE LVI.

FIG. 1. *Yoldia limatula* Say.
2. *Arca transversa* Say.
3. *Tagelus gibbus* Spengler.
4. *Nucula proxima* Say.
5. *Tagelus divisus* Spengler.
6. *Macoma baltica* Linné, var. *fusca* Adams.
7. *Kellia planulata* Stimpson, enlarged about twice nat. size.
8. *Nucula delphinodonta* Mighels, enlarged to about twice nat. size.
9. *Yoldia sapotilla* Gould.
10. *Macoma tenta* Say, typical form.
11. *Gemma purpurea* H. C. Lea (*G. gemma* Totten), identified from Lea's type.
12. *Tellina tenella* Verrill.
13. *Tellina tenera* Say.
14. *Cumingia tellinoides* Conrad.
15. *Cytherea convexa* Say.
16. *Arca* (*Argina*) *pexata* Say.

For remarks see note under Plate L. Fig. 12 was drawn by Prof. A. E. Verrill.

PLATE LVII.

FIG. 1. *Cyprina islandica* Linné.
2. *Mactra solidissima* Dillwyn.

For remarks see note under Plate L.

PLATE LVIII.

FIG. 1. *Astarte undata* Gould.
2. *Cryptodon Gouldii* Philippi.
3. *Solenomya velum* Say.
4. *Astarte quadrans* Gould, Long Island Sound northward to Nova Scotia.
5. *Cardium pinnulatum* Conrad.
6. *Divaricella dentata* Wood.
7. *Astarte castanea* Say.
8. *Liocardium Mortoni* Conrad, showing extended animal.
9. *Venericardia borealis* Conrad, typical form.
10. *Venericardia borealis* var. *novangliæ* Morse.
11. *Eriphyla lunulata* Conrad, enlarged.
12. *Cryptodon obesus* Verrill, greatly enlarged.
13. *Eriphyla lunulata* Conrad, natural size.
14. *Lucina filosa* Stimpson.

See Plate L for remarks. Figures 1, 11, and 12 were drawn by Prof. A. E. Verrill.

PLATE LIX.

FIG. 1. *Xylotrya fimbriata* Jeffreys; showing shell, interior and exterior, pallets, and sculpture, enlarged.
2. *Teredo navalis* Linné; exterior of shell, pallets, and sculpture, enlarged.
3. *Teredo megotara* Hanley; shell, interior and exterior, and pallets, enlarged.
4. *Teredo Thomsoni* Tryon; shell, interior and exterior, and pallets, enlarged.
5. *Thracia myopsis* Beck; Arctic Seas to Cape Cod.
6. *Periploma* (*Cochlodesma*) *Leana* Conthouy.
7. *Periploma fragilis* Totten.
8. *Gastranella tumida* Verrill, enlarged.
9. *Thracia truncata* Mighels and Adams; Arctic Seas to New York.
10. *Corbula contracta* Say.
11. *Lyonsia hyalina* Conrad.
12. *Pholas* (*Barnea*) *truncata* Say.
13. *Saxicava arctica* Deshayes.
14. *Clidiophora Gouldiana* Dall (*C. trilineata* Gould non Say).
15. *Petricola pholadiformis* Lamarck.

For remarks see note under Plate L. Figure 8 was drawn by Prof. A. E. Verrill.

PLATE LX.

FIG. 66. *Drillia*? *Dalli* Verrill & Smith.
66 a. The same; side view of last whorl, showing anal notch.
67. *Pleurotomella Agassizii* Verrill; adult.
68. *Pleurotomella Bairdii* Verrill.
69. *Pleurotomella Pandionis* Verrill.
70. *Pleurotomella Packardi* Verrill; var. *Benedicti* Verrill & Smith.
70 a. The same; nucleus, showing sculpture of larval or *Sinusigera* shell.
71. *Pleurotomella Agassizii* Verrill; young.
71 a. The same; nucleus, showing *Sinusigera* sculpture.
72. *Pleurotomella Packardi* Verrill; var. *formosa* Jeffreys.
73. *Mangilia bandella* Dall.
74. *Pleurotomella Emertonii* Verrill & Smith.

The figures on this plate and several which follow were loaned by the U. S. Fish Commission. They first appeared in the Report of the Commissioner of Fisheries for 1883, though reduced copies of them had been used to illustrate Prof. Verrill's papers in the Transactions of the Connecticut Academy of Sciences. They were drawn under the supervision of Prof. Verrill for the U. S. Fish Commission by J. H. Emerton and others.

Some of these figures, in a reduced form, reappear on Plates XLIII–XLVI, but as they are rather small there it was thought best to duplicate them by using the larger figures, since the latter were available. Had *all* the figures on the reduced scale been available, separately, of larger size, none of the former would have been used; but, after all, the duplication is of little consequence, as, in a general way, it is true that the more good figures there are accessible, the better for students.

PLATE LXI.

FIG. 75. *Pleurotomella Bruneri* Verrill & Smith.
76. *Pleurotomella catherinæ* Verrill & Smith.
76 a. The same, enlarged tip, showing sculpture of nucleus.
77. *Mangilia comatotropis* Dall.
78. *Bela Tanneri* Verrill & Smith.
79. *Marginella* (*apicina* var. ?) *borealis* Verrill.
80. *Buccinum abyssorum* Verrill, and operculum.
81. *Sipho Sarsii* Jeffreys.
82. *Sipho* (?) *glyptus* Verrill.
86. *Rissoa Jan-Mayeni* Friele.
90. *Scala groenlandica* Perry.
91. *Scala Dalliana* Verrill & Smith.
92. *Scala Pourtalesii* Verrill & Smith.
93. *Scala* (*Opalia*) *Leeana* Verrill.
94. *Scala Andrewsii* Verrill; 5.5, Newport, R. Id., 100 fms.

For remarks on these figures see note under preceding plate.

PLATE LXII.

FIG. 83. *Eudolium Crosseanum* Monterosato.
83 a. The same, showing soft parts of male specimen reduced one-third from natural size.
84. *Oöcorys sulcata* Fischer; shell.
84 a. The same; operculum.
84 b. The same; dentition.
85. *Torellia fimbriata* Verrill & Smith; Martha's Vineyard and northward.
87. *Fossarus elegans* Verrill & Smith.
88. *Seguenzia monocingulata* Seguenza.
88 a. The same, operculum, inside view.
89. The same, var. *eritima* Verrill.

For remarks on these figures see note under Plate LX.

PLATE LXIII.

FIG. 95. *Solarium boreale* Verrill, young shell.
95 a. The same, still younger, showing immersed nucleus.
96. *Calliostoma Bairdii* Verrill & Smith; from above, showing animal crawling.
97. *Solariella Ottoi* Philippi.
98. *Solariella lamellosa* Verrill & Smith.
99. *Cyclostrema fulgidum* Jeffreys.
100. *Addisonia paradoxa* Dall, from below, showing animal in shell.
100 a. The same, profile of shell.
101. *Cocculina leptalea* Verrill.
102. *Placophora atlantica* Verrill & Smith, viewed from above.
102 a. The same, viewed from below.
103. *Amicula vestita* Sowerby var. *Emersonii* Couthouy, viewed from below. This is a purely northern species.
103 a. The same, posterior part of body from below, showing the fenestræ and also the way in which the tail is temporarily channeled to allow of the expulsion of fæcal pellets.
104. *Turbonilla Rathbuni* Verrill & Smith.

For remarks in regard to these figures see note under Plate LX.

PLATE LXIV.

FIG. 106. *Scaphander nobilis* Verrill.
123. *Dentalium occidentale* Stimpson; ½.
124. The same, a more curved variety.
125. The same, a more finely grooved variety.
125 a. The same, transverse section of Fig. 125.
126. *Cadulus Pandionis* Verrill & Smith.
136. *Diplodonta turgida* Verrill & Smith; interior of left valve.
136 a. *Crenella decussata* Montagu.
140. *Leda acuta* Conrad; interior of left valve.
140 a. *Petricola pholadiformis* Lamarck; showing extended siphons.
141. *Pecten* (*Pseudamusium*?) *vitreus* Gmelin.
142. *Pseudamusium imbrifer* Lovèn; *a*, right and *b*, left valve.
142 a. *Turtonia minuta* Fabricius, with extended foot, greatly magnified; drawn by Prof. A. E. Verrill.
142 b. *Argonauta argo* Linné; typical Mediterranean form swimming: for comparison with the variety *Americana*.

Figure 136 *a* first appeared in the proceedings of the U. S. National Museum, illustrating Miss Bush's paper on the shells of Labrador. Figure 142 *b* is from the British Museum series, and was lent by the Smithsonian Institution. The others were received from the U. S. Fish Commission. See note under Plate LX. Figure 140 *a* is one of those drawn by Morse for Binney's Gould. Fig. 142 *a* is now first published.

PLATE LXV.

FIG. 127. *Teredo megotara* Hanley; removed from its burrow, showing shell, pallets and soft parts, about half natural size.
128. *Poromya sublevis* Verrill; interior of right valve.
128 a. *Siliqua costata* Say; interior, showing hinge, pallial line, and muscular impressions.
129. *Cuspidaria striata* Jeffreys.
130. *Cetoconcha bulla* Dall.
131. *Verticordia* (*Trigonulina*) *ornata* Orbigny, right value; *a*, interior, *b*, exterior view.
132. *Verticordia flexuosa* Verrill & Smith, exterior of left valve.
133. *Lyonsia*? *arata* Verrill & Smith, showing hinge in right valve of two specimens, *a* and *b*.
134. The same, exterior of right valve.
135. *Diplodonta turgida* Verrill & Smith, interior of right valve.

Figure 128 a is now first published. For the others see note under Plate LX.

PLATE LXVI.

FIG. 110. *Atlanta Peronii* Lesueur, side view of shell.
110 a. The same, front view.
111. *Atlanta Gaudichaudi* Eydoux & Souleyet, from a camera lucida sketch by Mr. W. E. Safford.
112. *Creseis conica* Eschscholtz, showing animal in situ.
113. *Cavolinia tridentata* Forskäl, with animal extended.
115. *Cavolinia* (*Diacria*) *trispinosa* Gray, with animal extended.
116. *Cavolinia uncinata* Rang, with animal extended.
117. *Cuvierina columnella* Rang, showing extended animal, and remnant of the larval cone at the base.
118. *Creseis recta* Blainville, side view of shell, greatly enlarged.

PLATE LXVI—Continued.

FIG. 119. *Cresĕis* (*Hyalocylix*) *striata* Rang, showing animal extended, enlarged.

120. *Corolla calceola* Verrill, with extended animal in situ, two-thirds natural size. This species and *C. spectabilis* Dall, of the Pacific, belong to the same group. The former was referred to *Gleba*, Forskäl, by Dr. Pelseneer in his description of the Challenger Pteropods, probably on account of the poor state of his material. But *C. spectabilis* has precisely such a "shell" as *C. calceola*, which does not resemble the "shell" of *Gleba*, and has been taken with its "shell" in the Santa Barbara Channel, California. The genus *Cymbuliopsis* Pelseneer, being of later date than *Corolla*, will therefore fall into the synonymy of the latter name.

121. *Spongiobranchia australis* Orbigny. This figure represents the adult form of a tropical Pteropod not yet found on our coast, though certain larvæ, perhaps of *Notobranchæa*, have been referred to it.

122. *Clione limacina* Phipps.

Figures 112 and 113 are from Binney's Gould. The remarks applying to the others will be found under Plate LX.

PLATE LXVII.

FIG. 63. *Argonauta argo* Linné, var. *americana* Dall. Animal removed from the shell and somewhat contracted by immersion in alcohol.

63 a. The same, front view of shell.

63 b. The same, side view of shell.

The average *Argonauta argo* of the Mediterranean has from two to three times as many radial folds and carinal nodules as the variety here figured. It is also more compressed and narrow, and the marginal rib on each side of the aperture is less prominent and usually is merged in the margin imperceptibly and does not stand out laterally at all. There are, doubtless, variations in these characters, but on the whole the Antillean and American form seems sufficiently constant for the latter to receive a varietal name.

For remarks on the figures, see note under Plate LX.

PLATE LXVIII.

FIG. 1. *Teredo dilatata* Stimpson, interior and exterior views of valves; pallets.

2. *Teredo norvegica* Spengler, enlarged; interior view of valve; the two valves united; pallets.

3. *Lyrodus chlorotica* Gould; interior and exterior view of valves, and the two pallets.

4. *Spirula Peronii* Lamarck; shell.

5. *Kellia suborbicularis* Montagu; natural size; hinge line and umbo magnified.

6. *Montacuta elevata* Stimpson.

7. *Turtonia minuta* O. Fabricius.

8. *Nucula tenuis* Montagu; somewhat enlarged.

9. *Pholas* (*Barnea*) *costata* Linné.

10. *Zirphæa crispata* Leach.

The figures of which this and the remaining plates (LXIX–LXXIV) are composed are from Mr. W. G. Binney's edition of Gould's Invertebrata of Massachusetts, drawn by Prof. E. S. Morse, and borrowed for the purposes of this publication from the Smithsonian Institution.

PLATE LXIX.

FIG. 1. *Astyris rosacea* Gould.
2. *Mya arenaria* Linné.
3. *Litorina rudis*, var. *tenebrosa*, Montagu.
4, 5. *Terebratulina septentrionalis* Couthouy; hæmal view and side view.
6. *Litorina irrorata* Say.
7. *Petricola pholadiformis* Lamarck.
8. *Mactra lateralis* Say.
9. *Thracia Conradi* Couthouy.

PLATE LXX.

FIG. 1. *Mactra ovalis* Gould.
2. *Pecten magellanicus* Gmelin.

PLATE LXXI.

FIG. 1. *Venus mercenaria*, var. *notata*, Say.
2. *Mytilus edulis* Linné; typical form.
3. *Venus mercenaria* Linné; typical.

PLATE LXXII.

FIG. 1. *Chione limacina* Phipps; enlarged to twice natural size.
2. *Philine sinuata* Stimpson.
3. *Philine quadrata* Searles Wood; Europe, Arctic seas, southward to Cape Cod.
4. *Scaphander puncto-striatus* Mighels and Adams; enlarged about one-third.
5. *Lamellaria pellucida* Verrill.
6. *Utriculus pertenuis* Mighels.
7. *Utriculus Gouldii* Couthouy.
8. *Philine lineolata* Couthouy; enlarged three times. Arctic seas, southward to Cape Cod.
9. *Adeorbis costulata* Möller.
10. *Scala grœnlandica* Perry.
11. *Sipho Stimpsoni* Mörch.
12. *Buccinum undatum* Linné.

PLATE LXXIII.

FIG. 1. *Fulgur canaliculatus* Linné.

PLATE LXXIV.

FIG. 1. *Fulgur carica* Gmelin.

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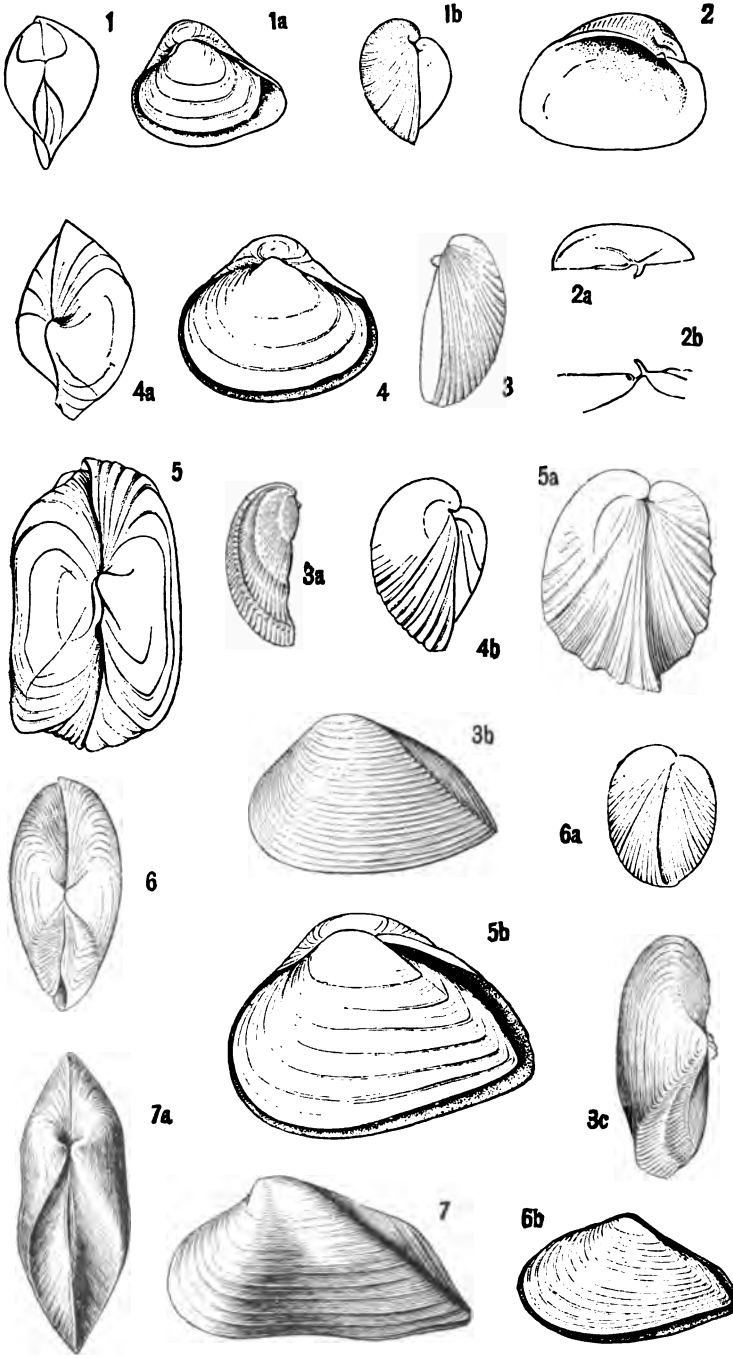
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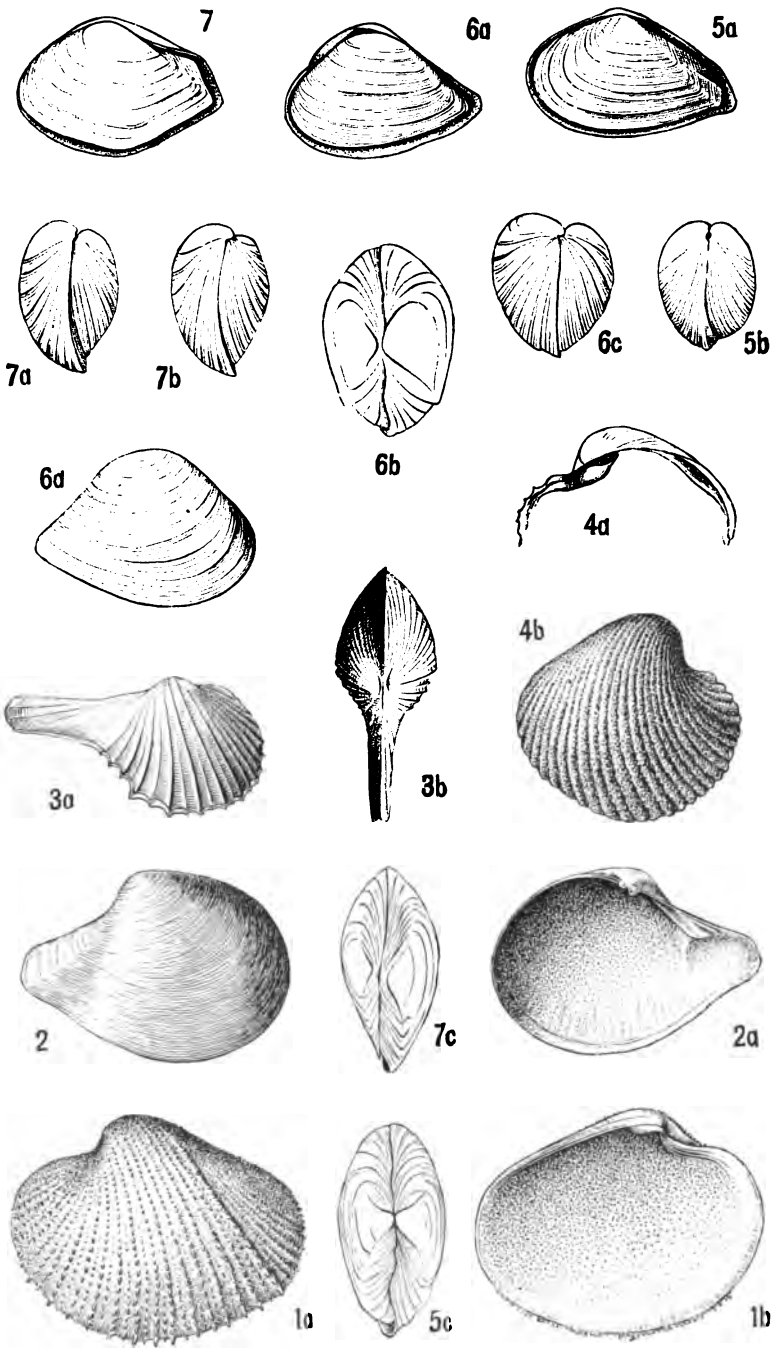
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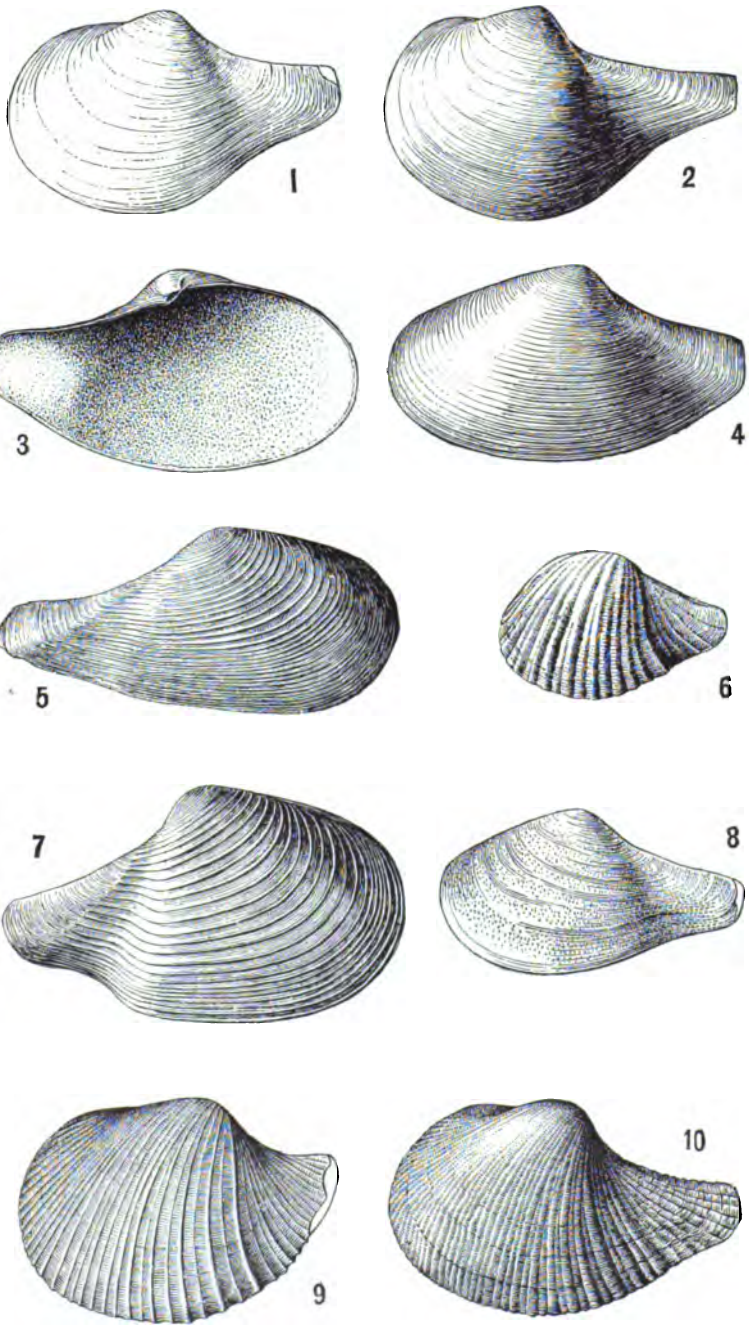
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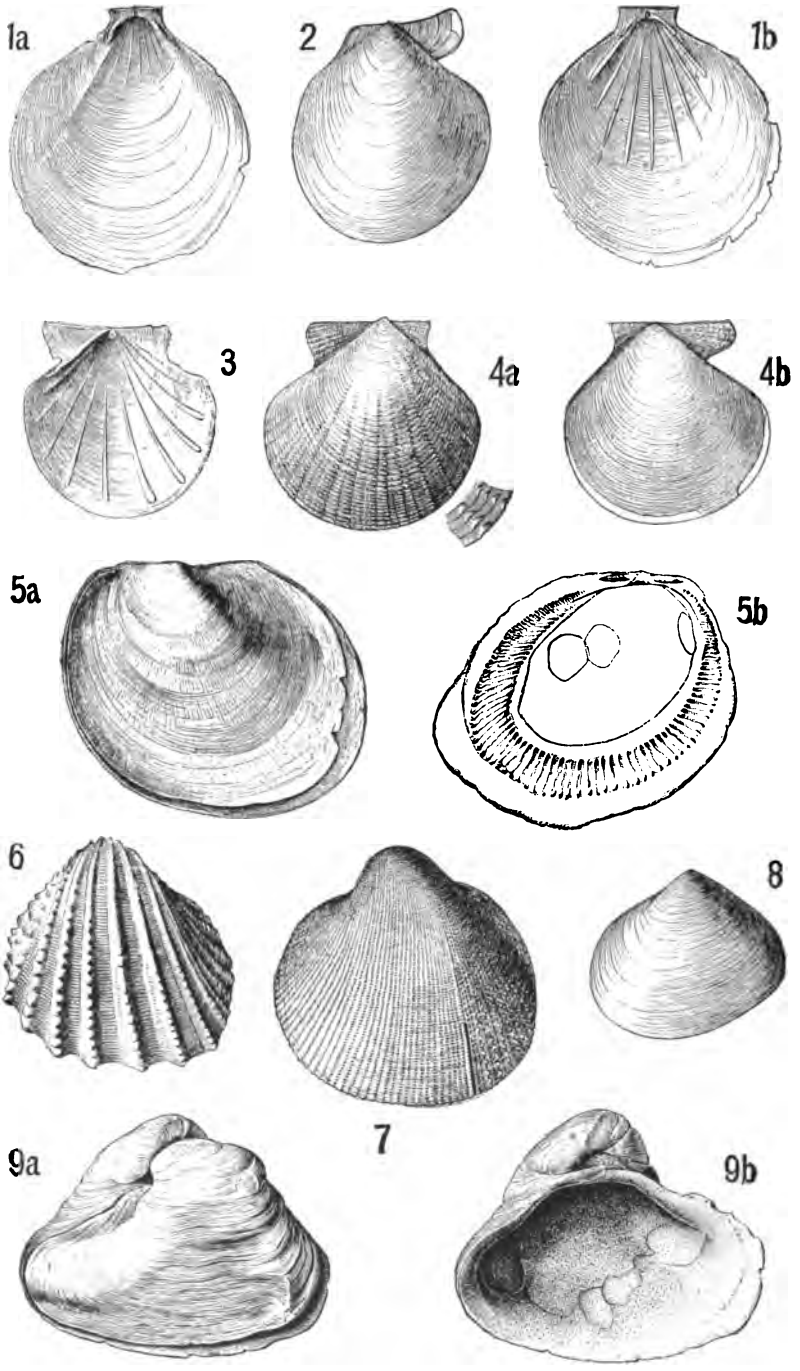
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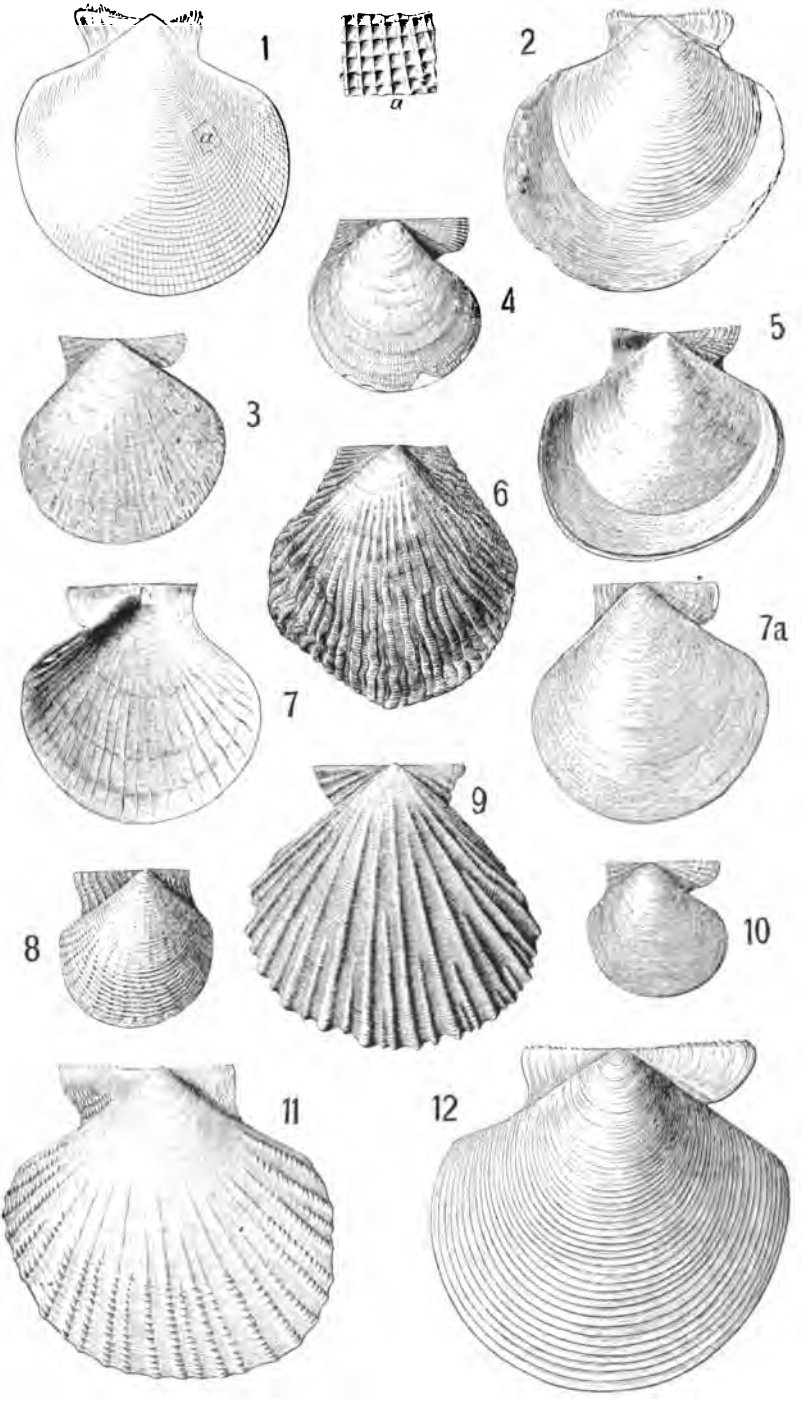
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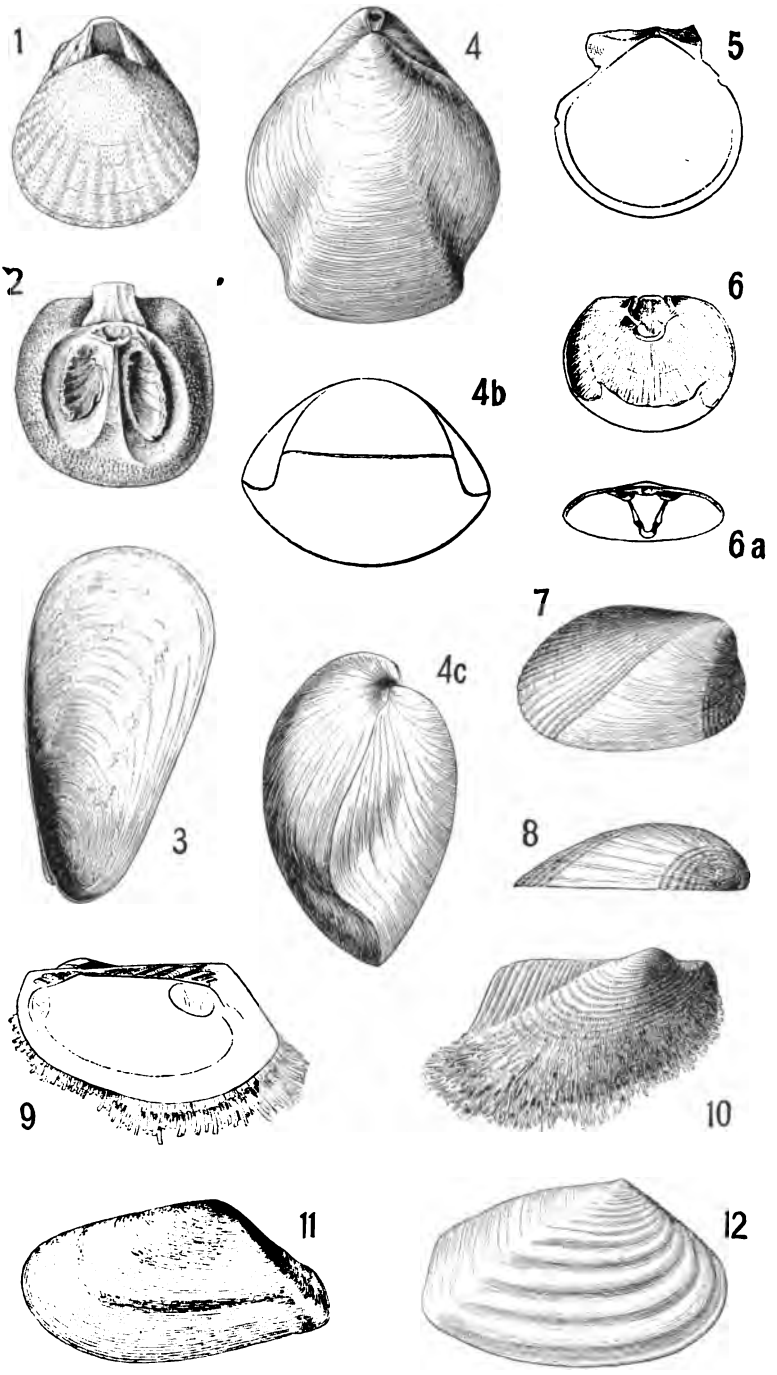
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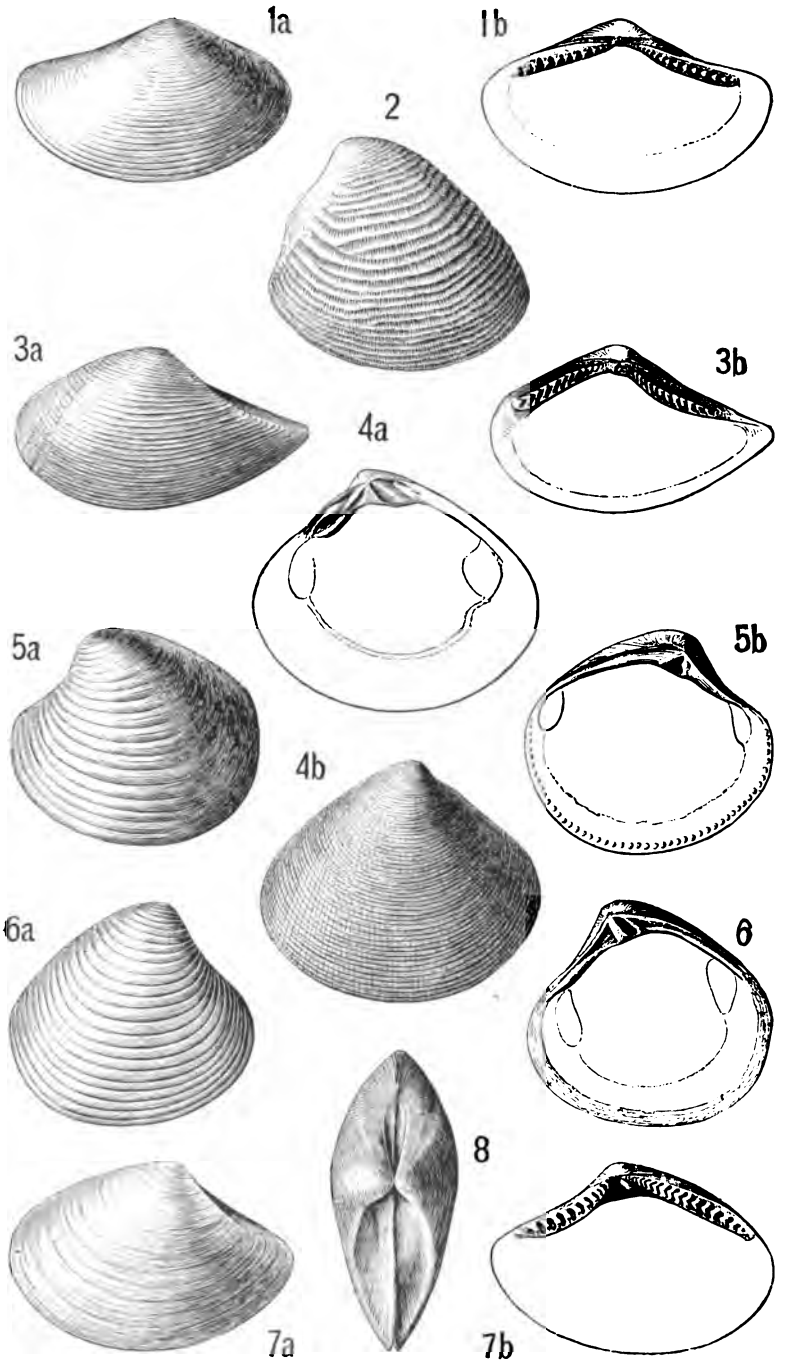
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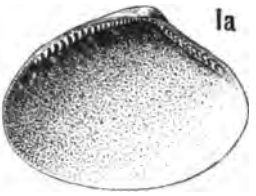
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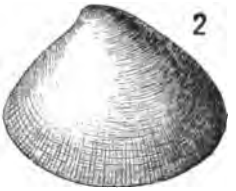
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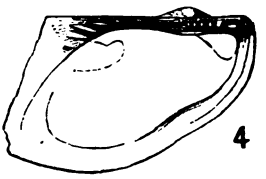
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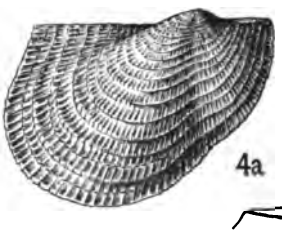
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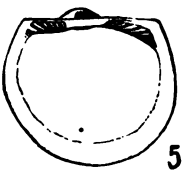
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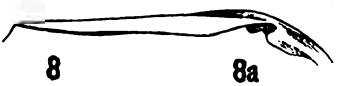
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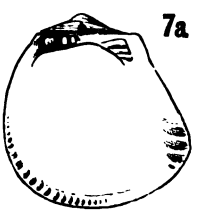
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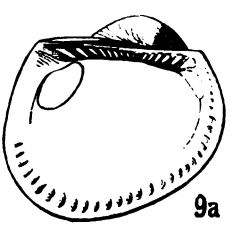
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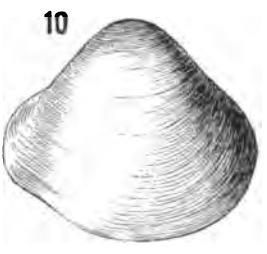
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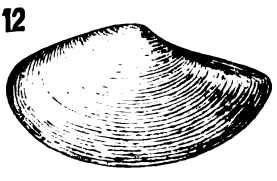
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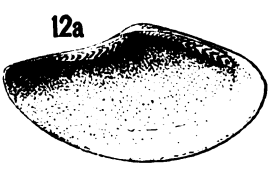
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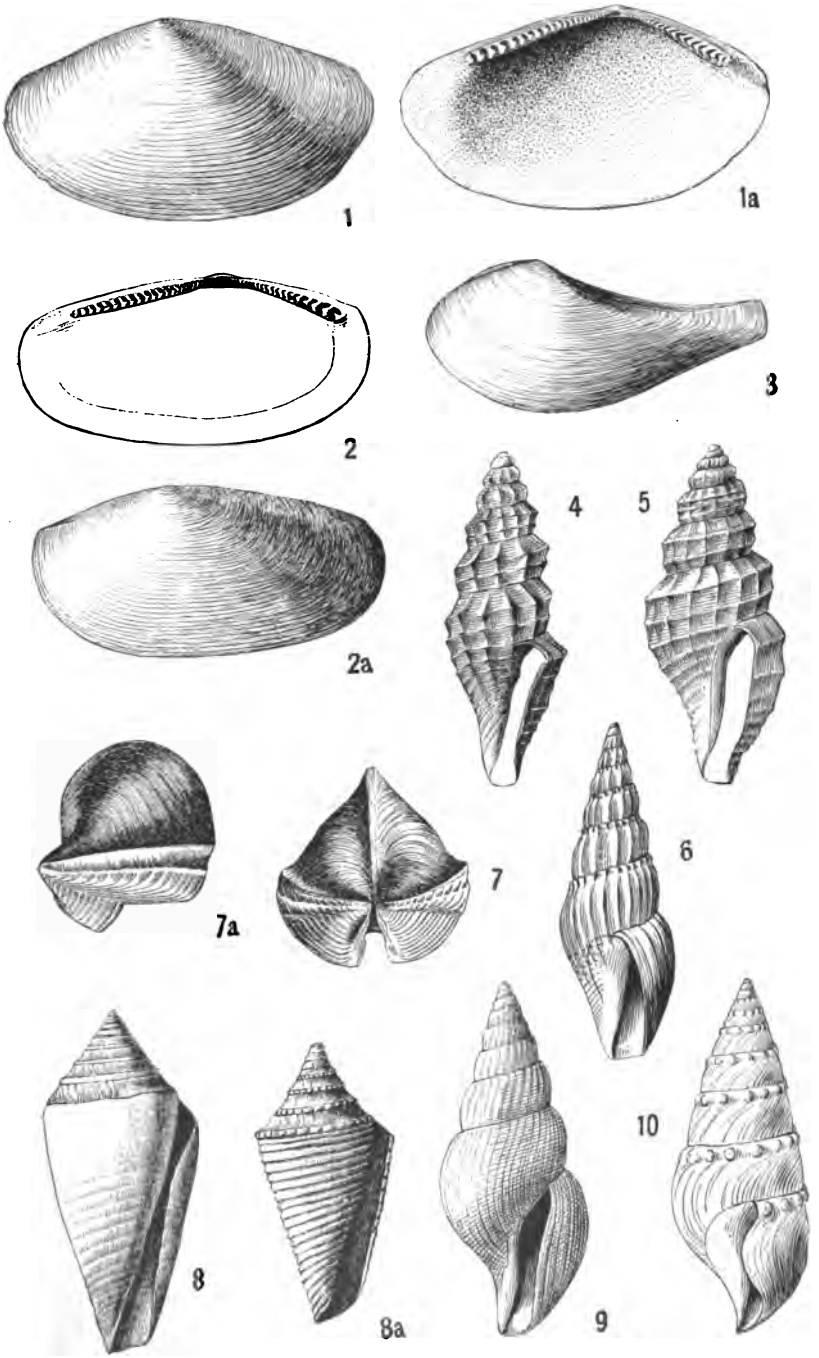
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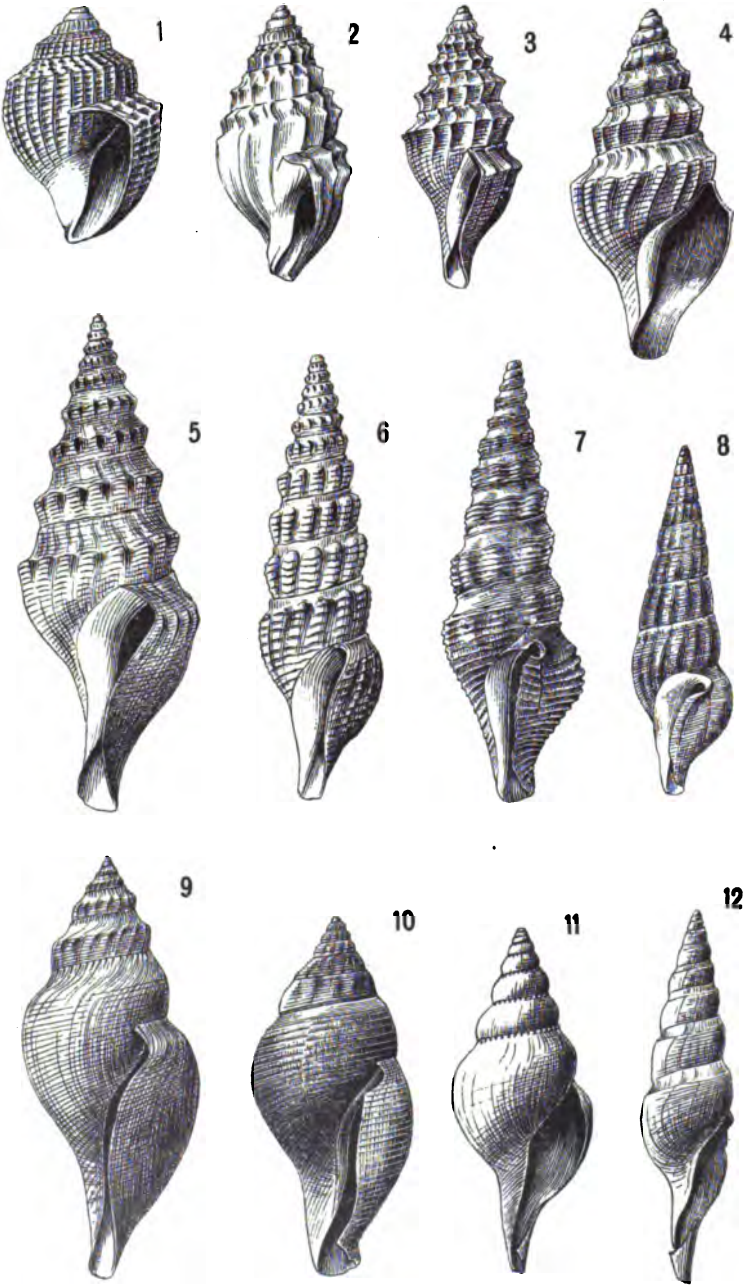

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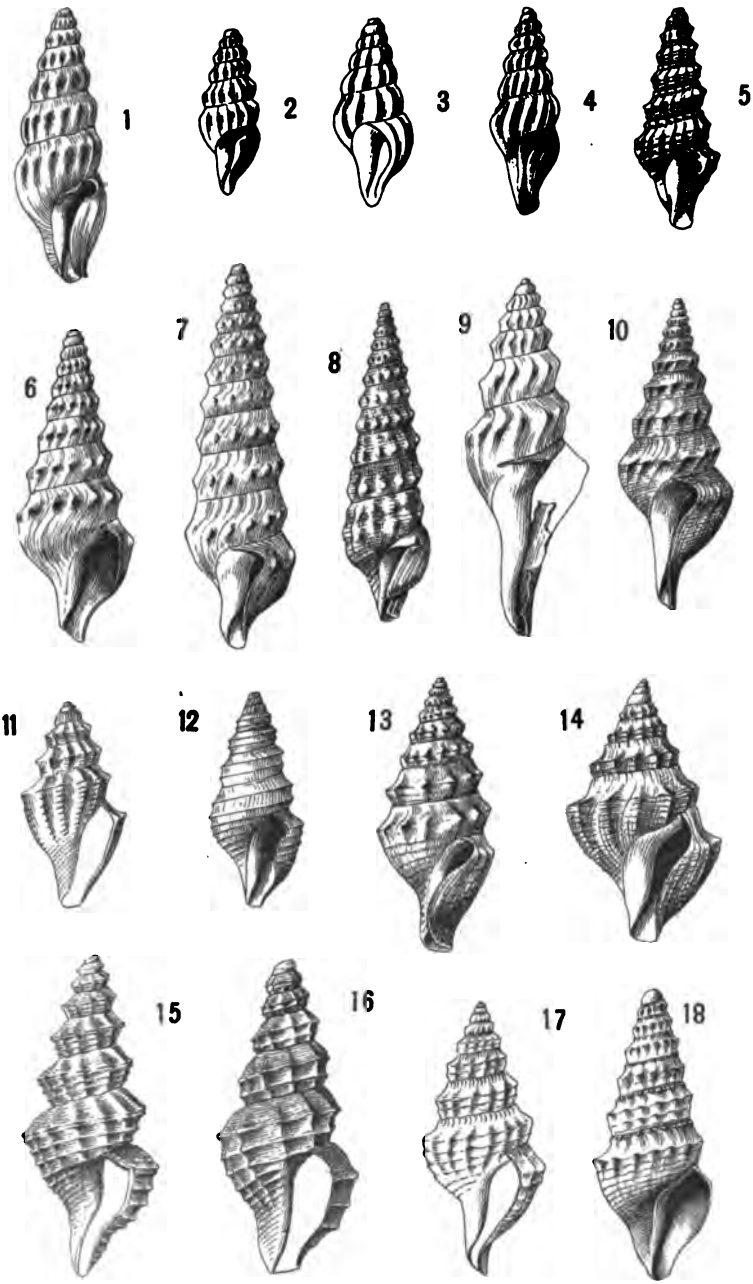

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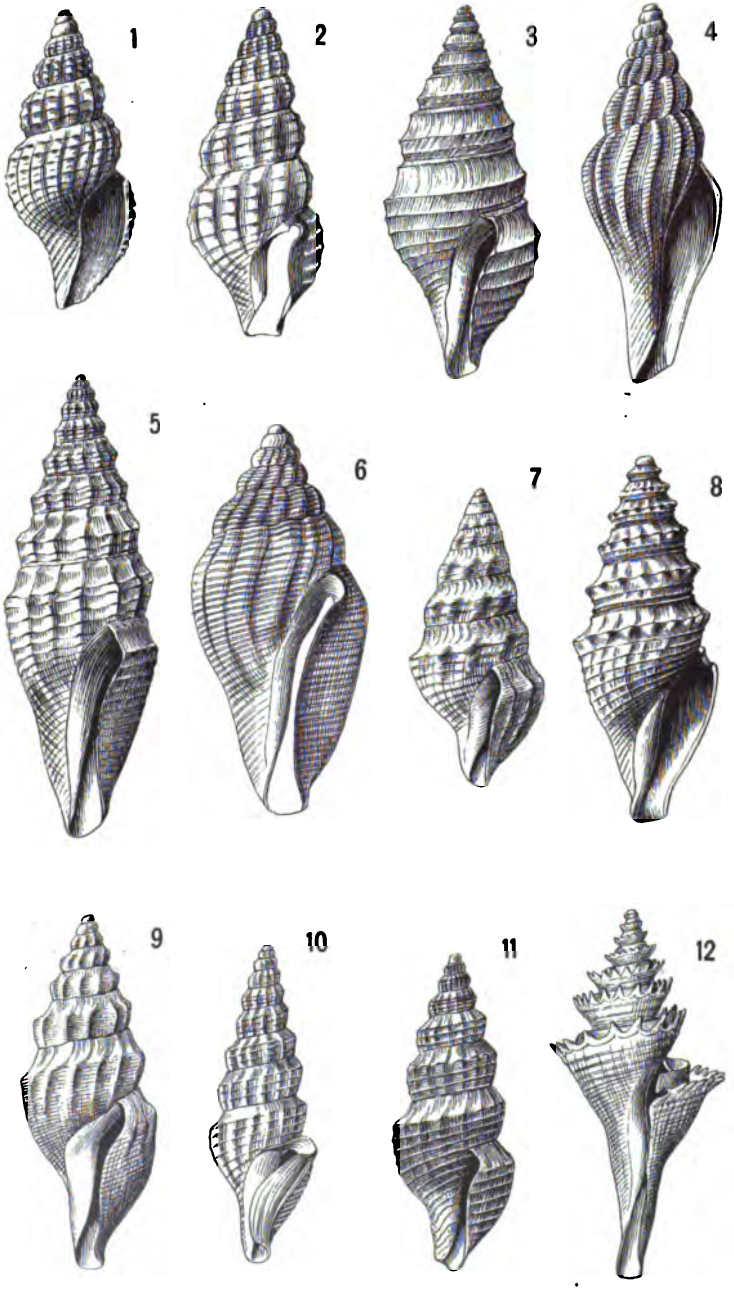

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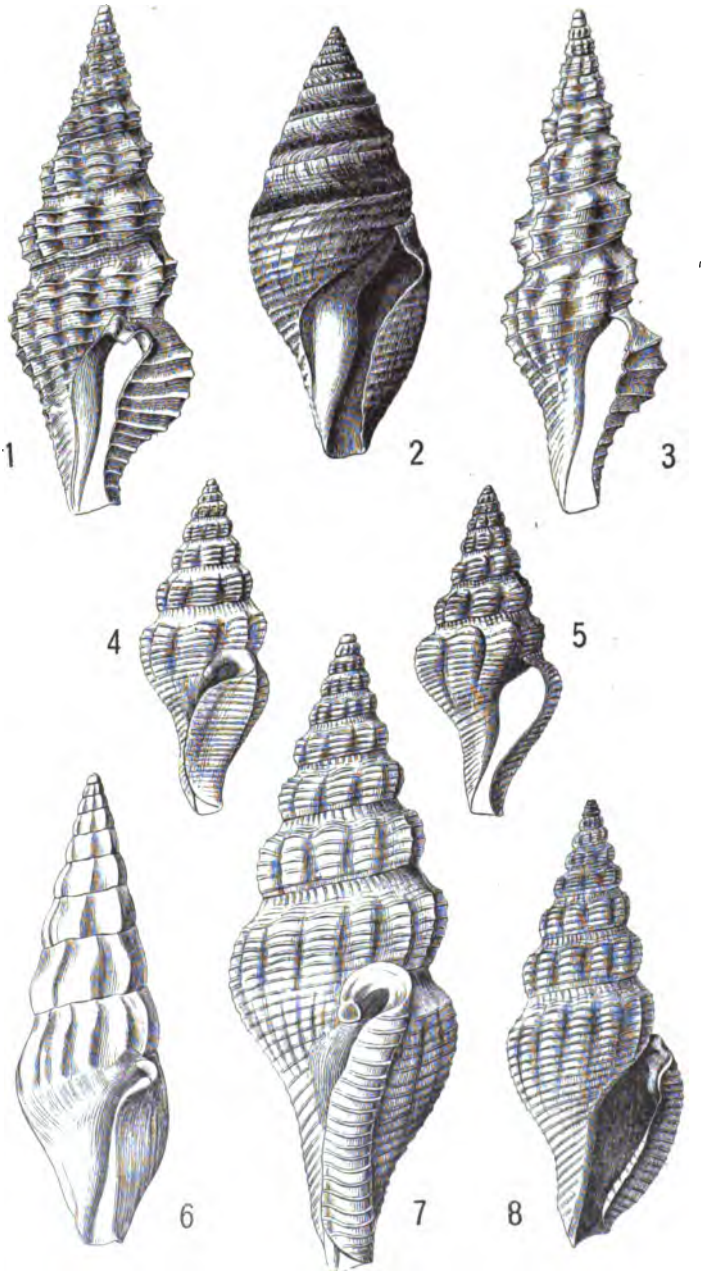

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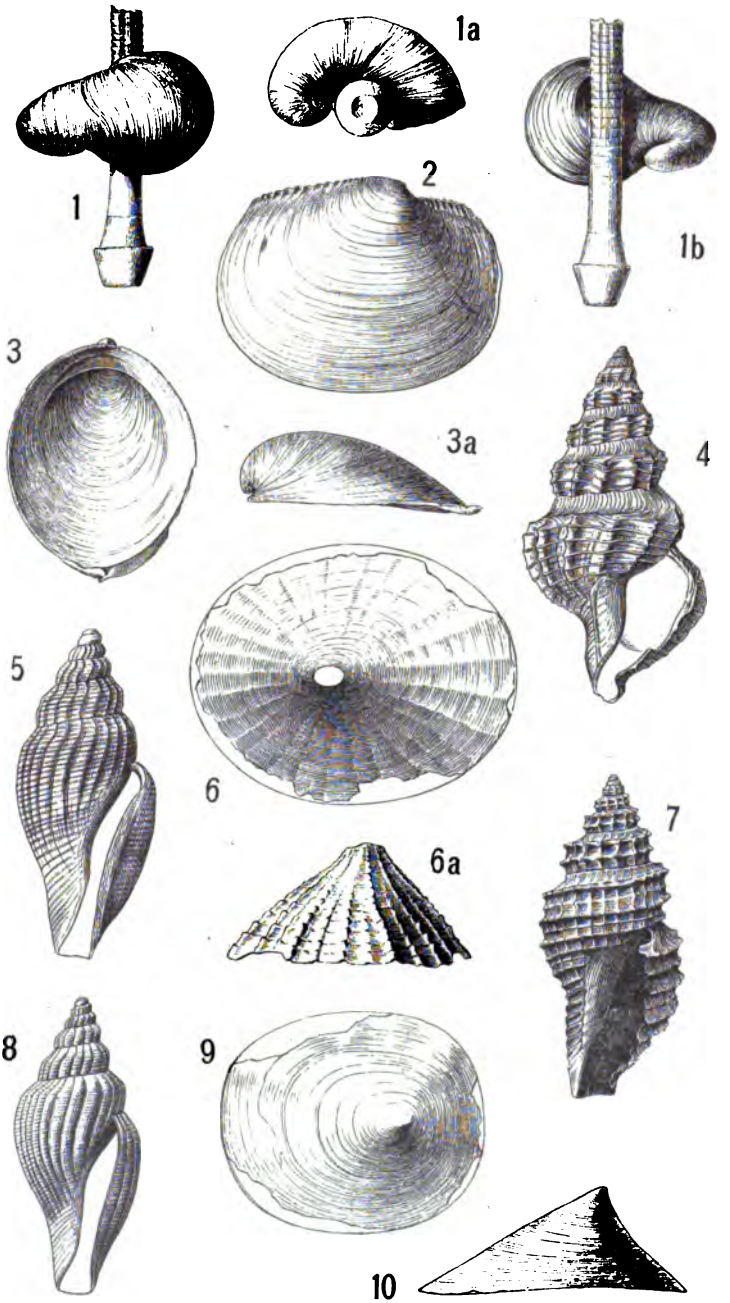

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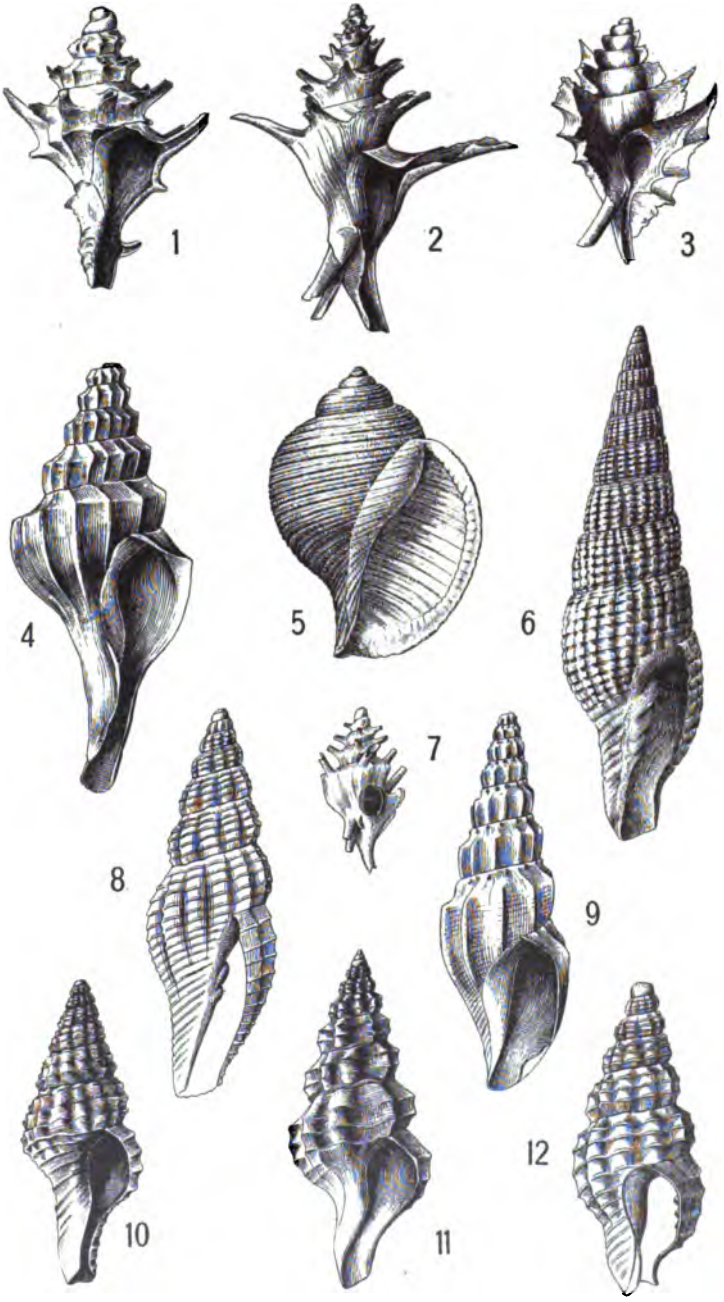

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PLATE XVI.

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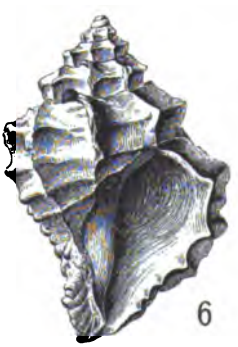
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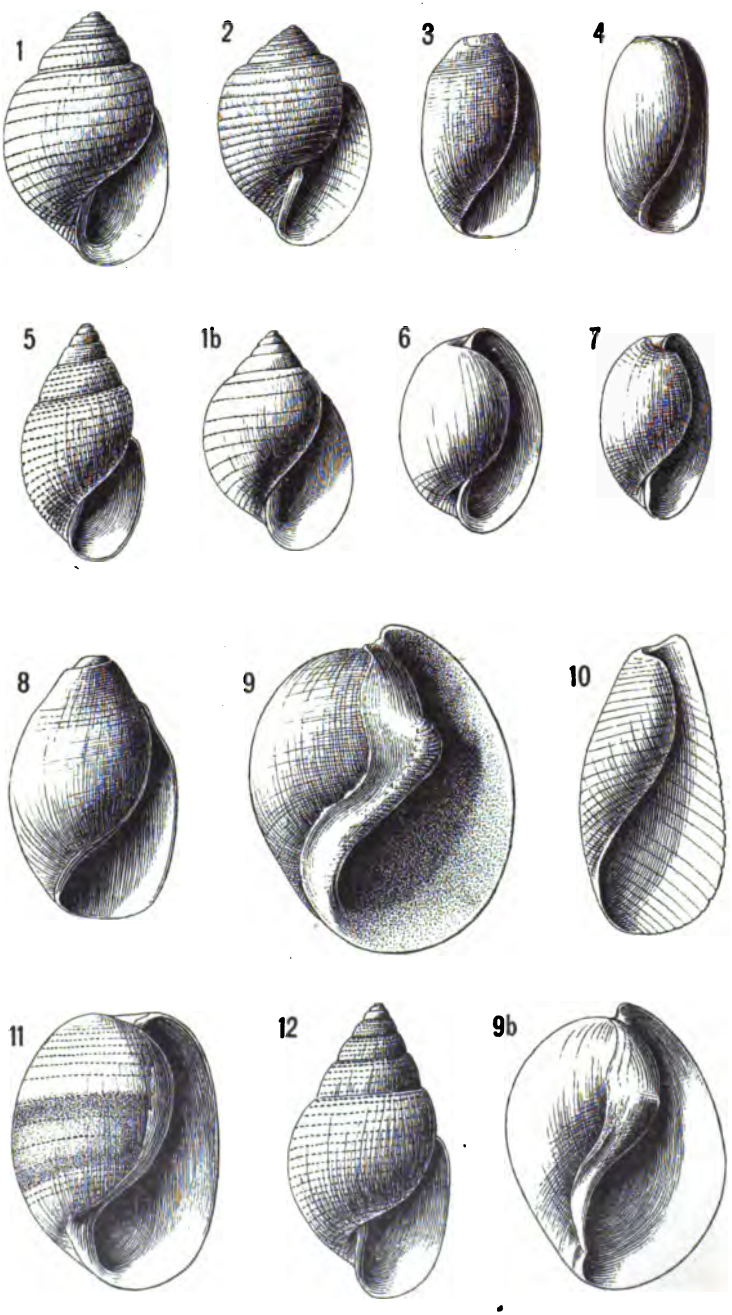

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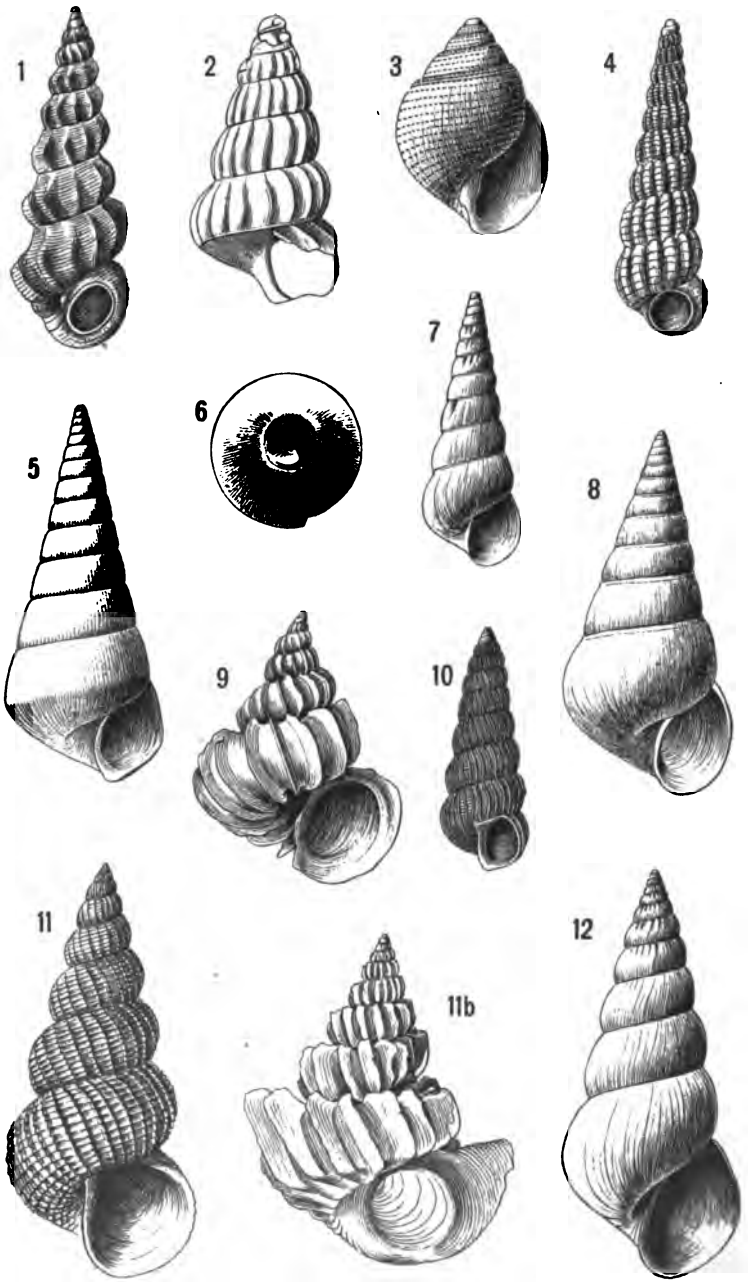

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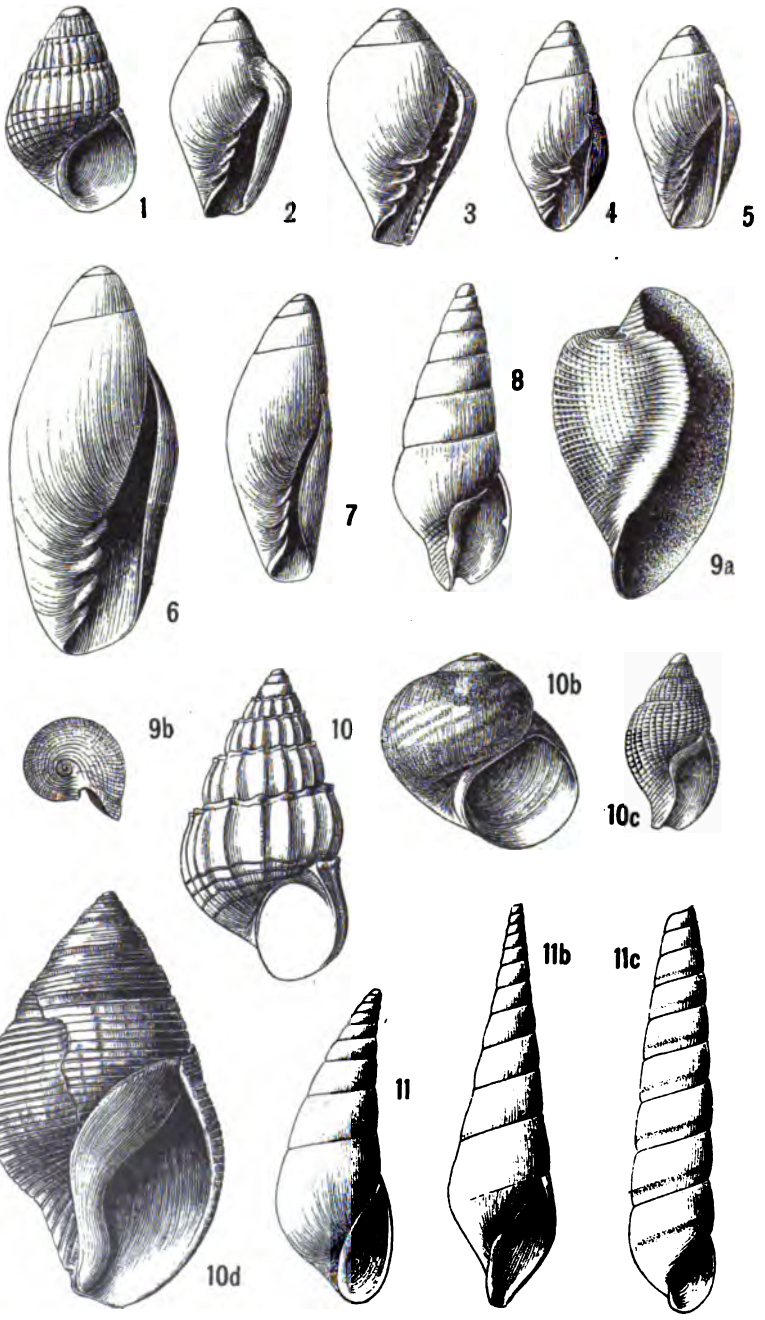

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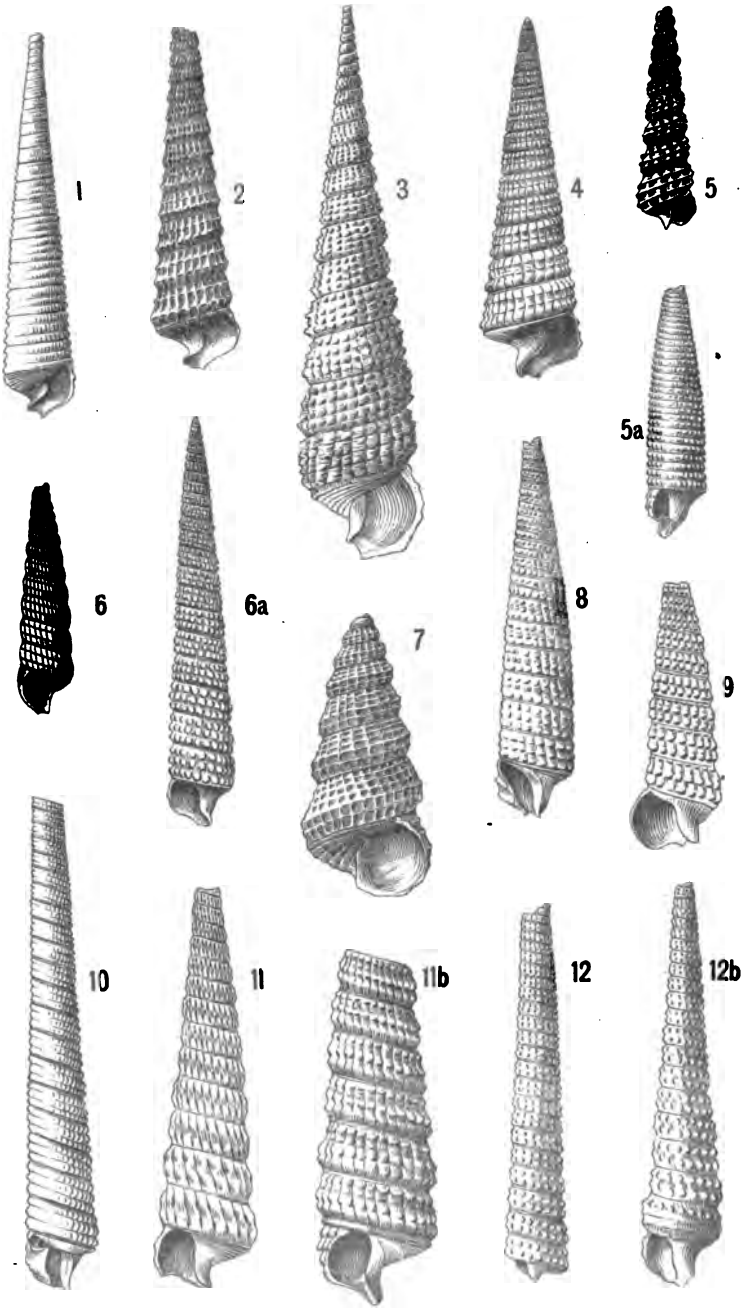

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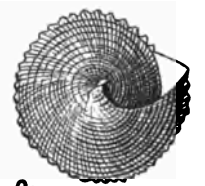
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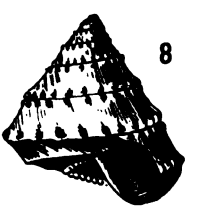
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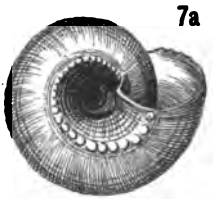
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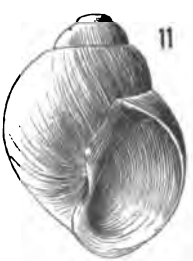
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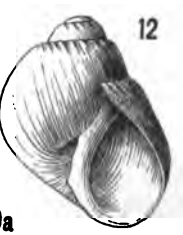
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Photo. Lith by L. S. Punderson & Son, New Haven. Conn.

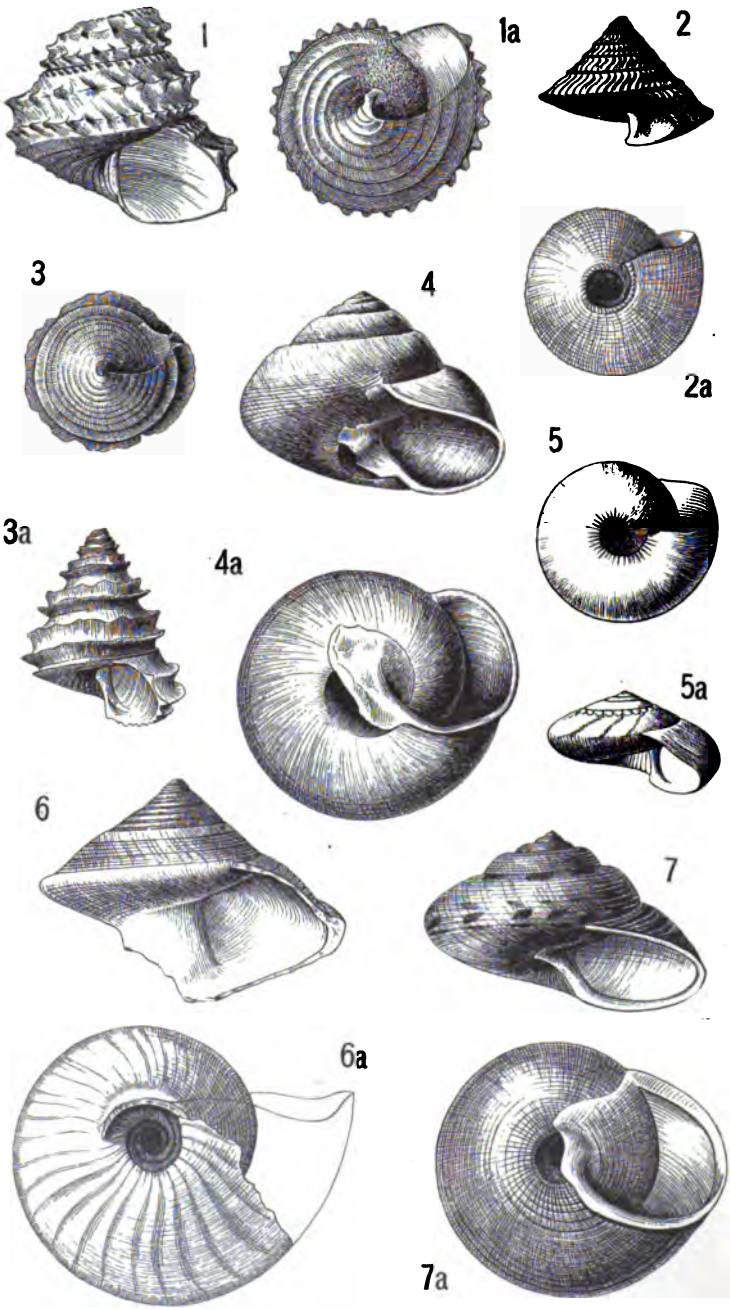

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Photo. Lith by L. S. Punderson & Son, New Haven, Conn.

PLATE XXIII.

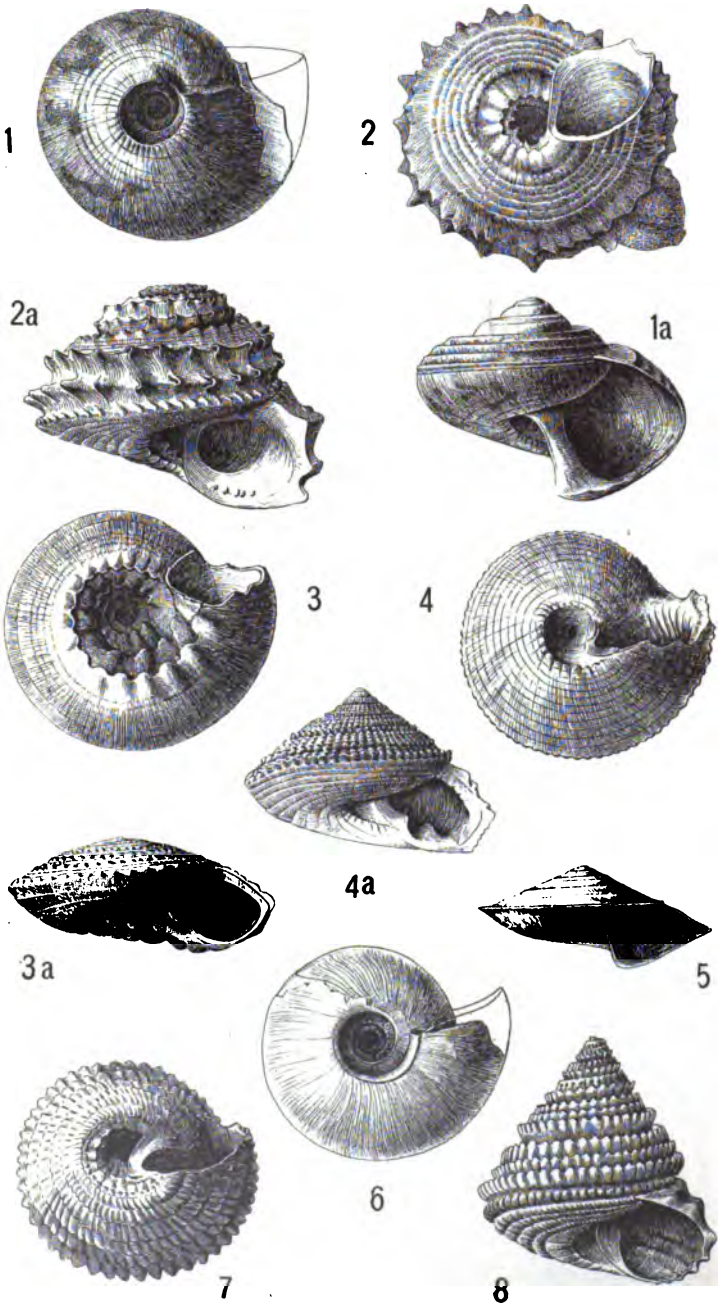

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Photo. Lith. by L. S. Punderson & Son, New Haven, Conn.

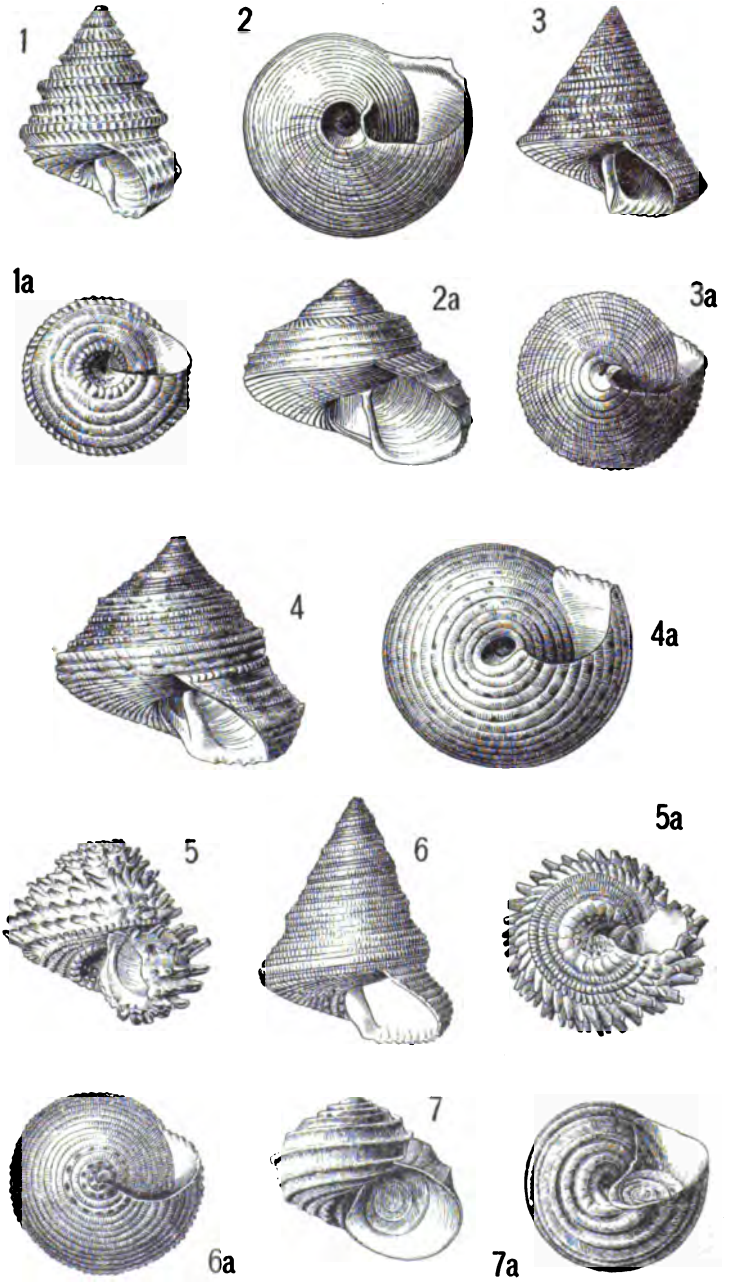

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Photo. Lith by L. S. Punderson & Son, New Haven, Conn.

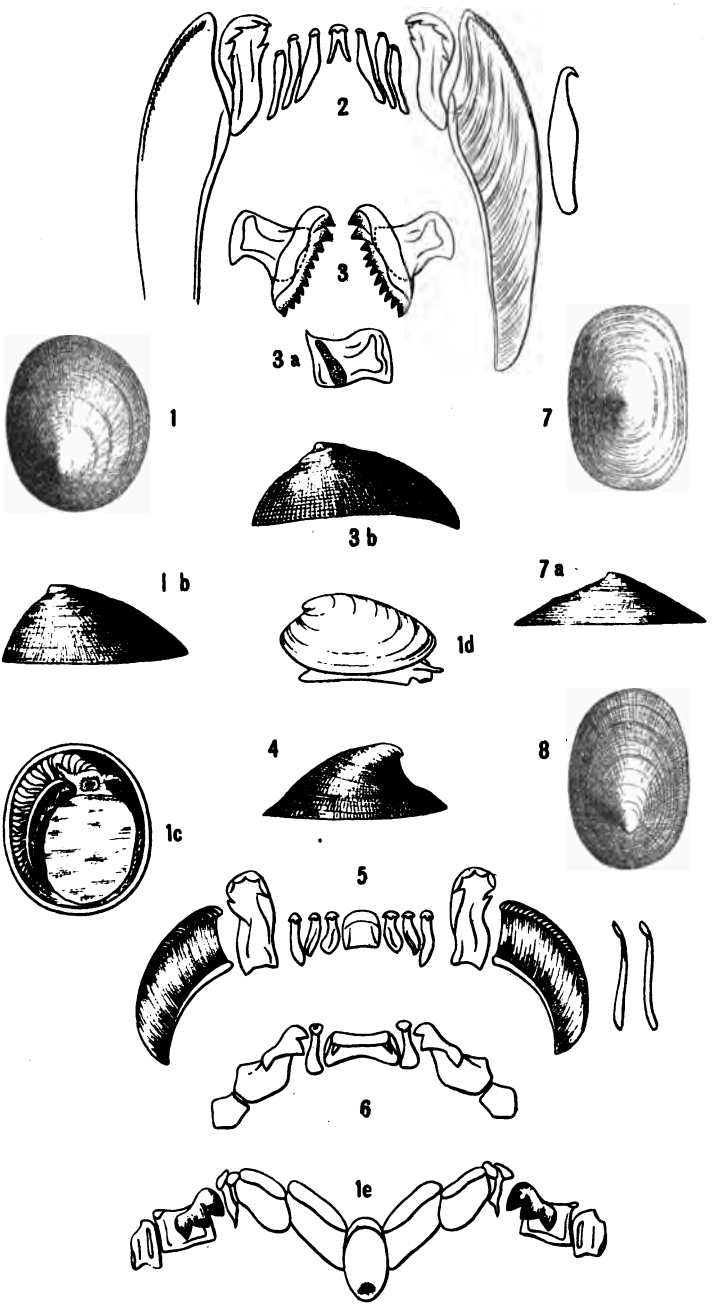

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Photo Lith by L. S. Punderson & Son, New Haven, Conn.

PLATE XXVI.

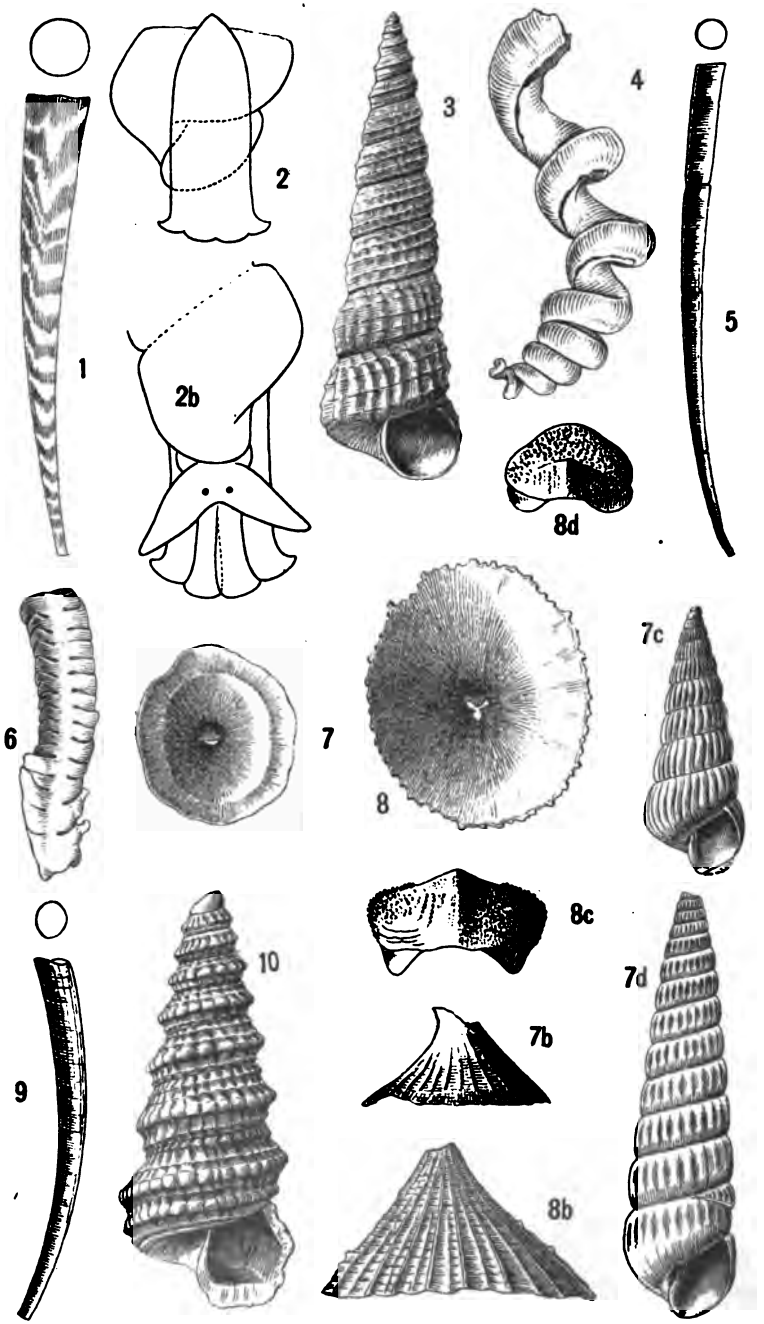

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Photo. Lith by L.S. Punderson & Son, New Haven, Conn.

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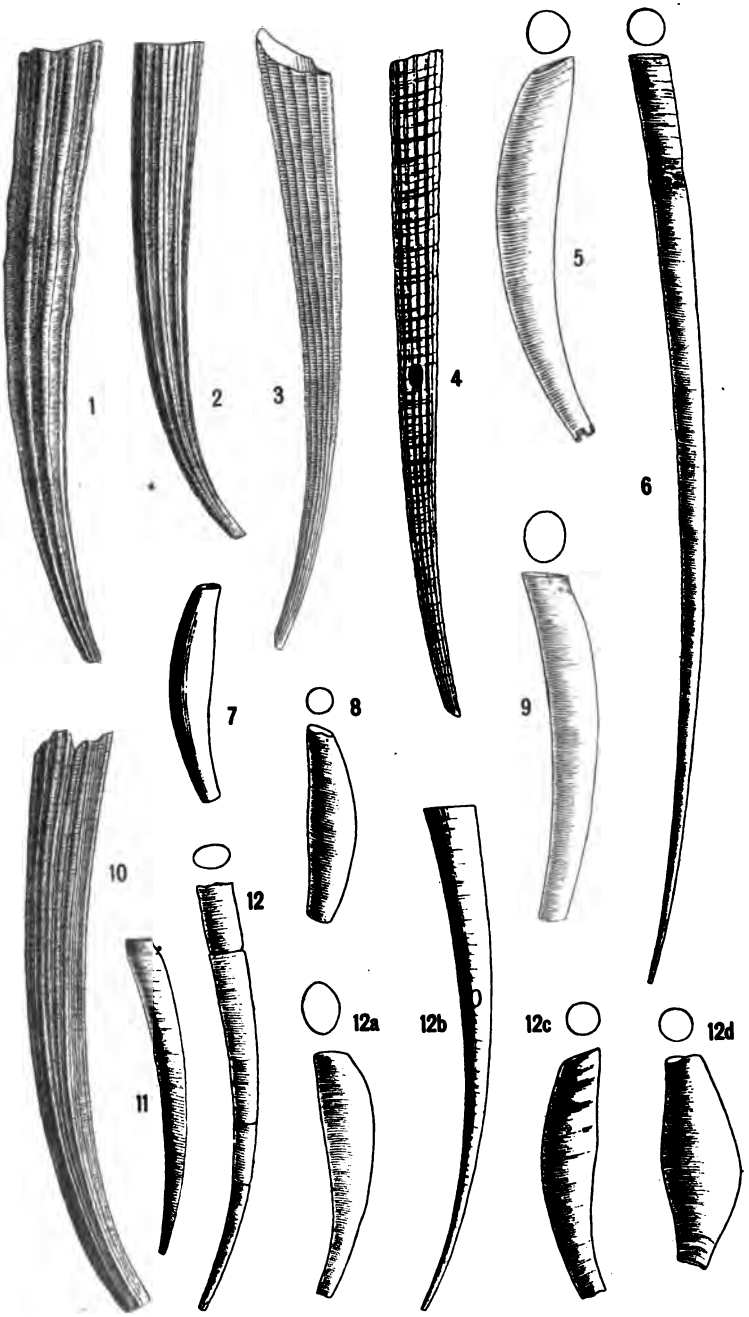

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Photo. Lith. by L. S. Punderson & Son, New Haven, Conn.

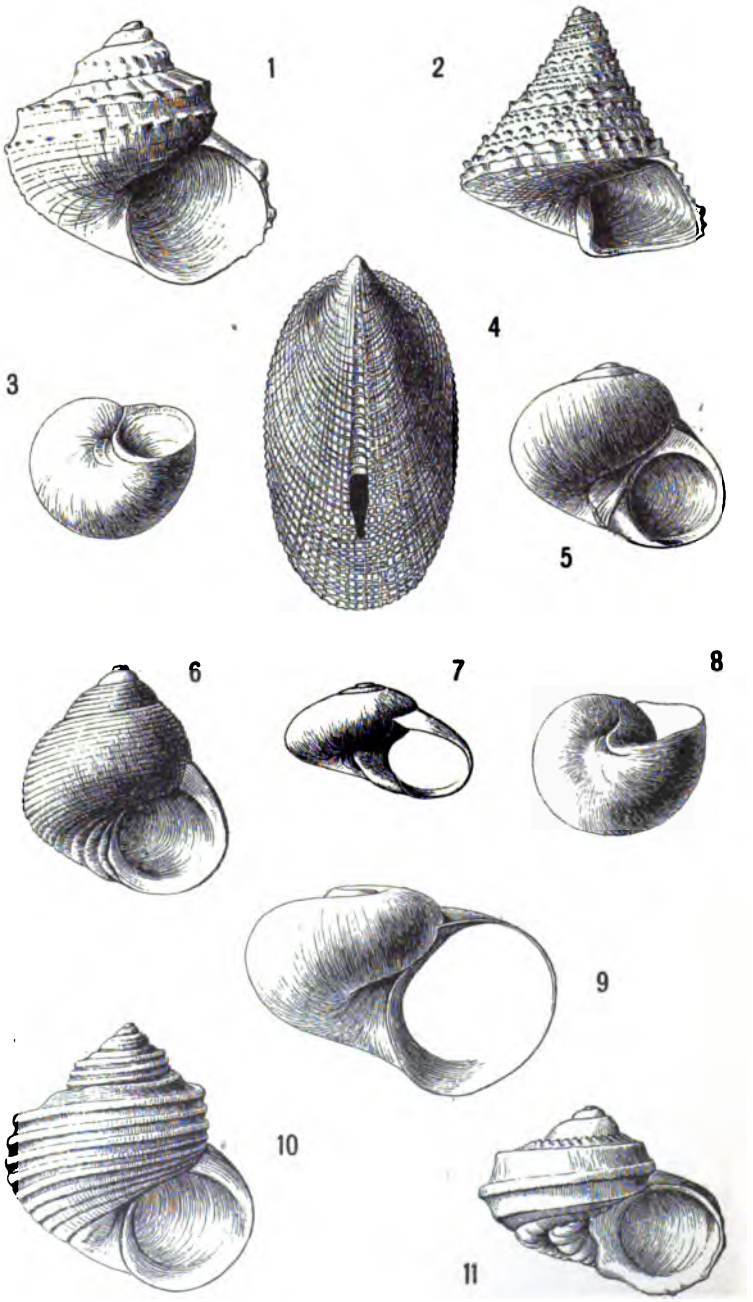

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Photo. Lith. by L. S. Punderson & Son, New Haven, Conn.

PLATE XXIX.

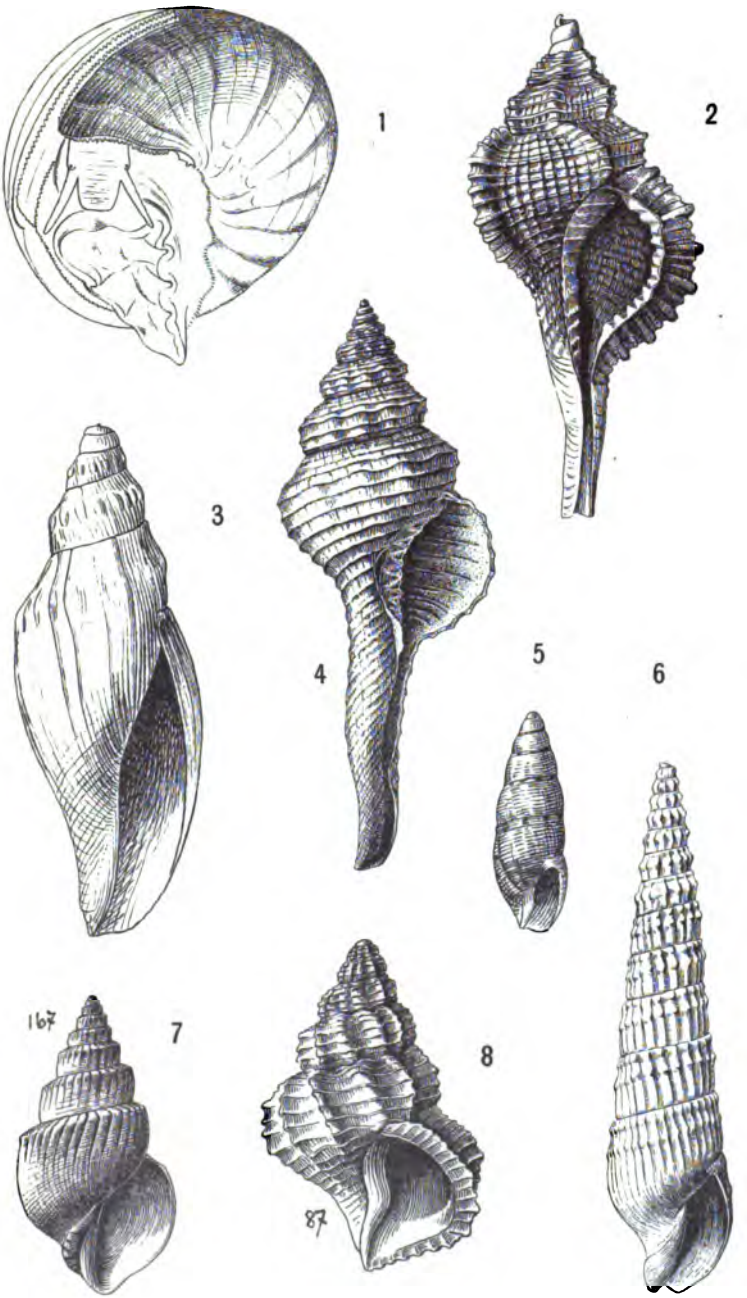

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Photo. Lith. by L. S. Punderson & Son, New Haven, Conn.

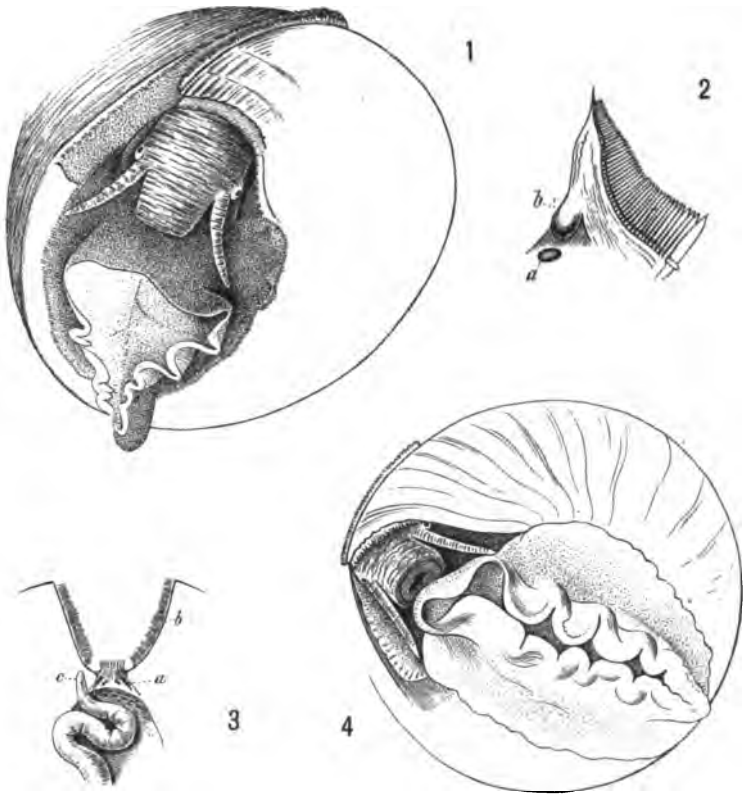

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Photo. Lith. by L. S. Punderson & Son, New Haven, Conn.

PLATE XXXI.

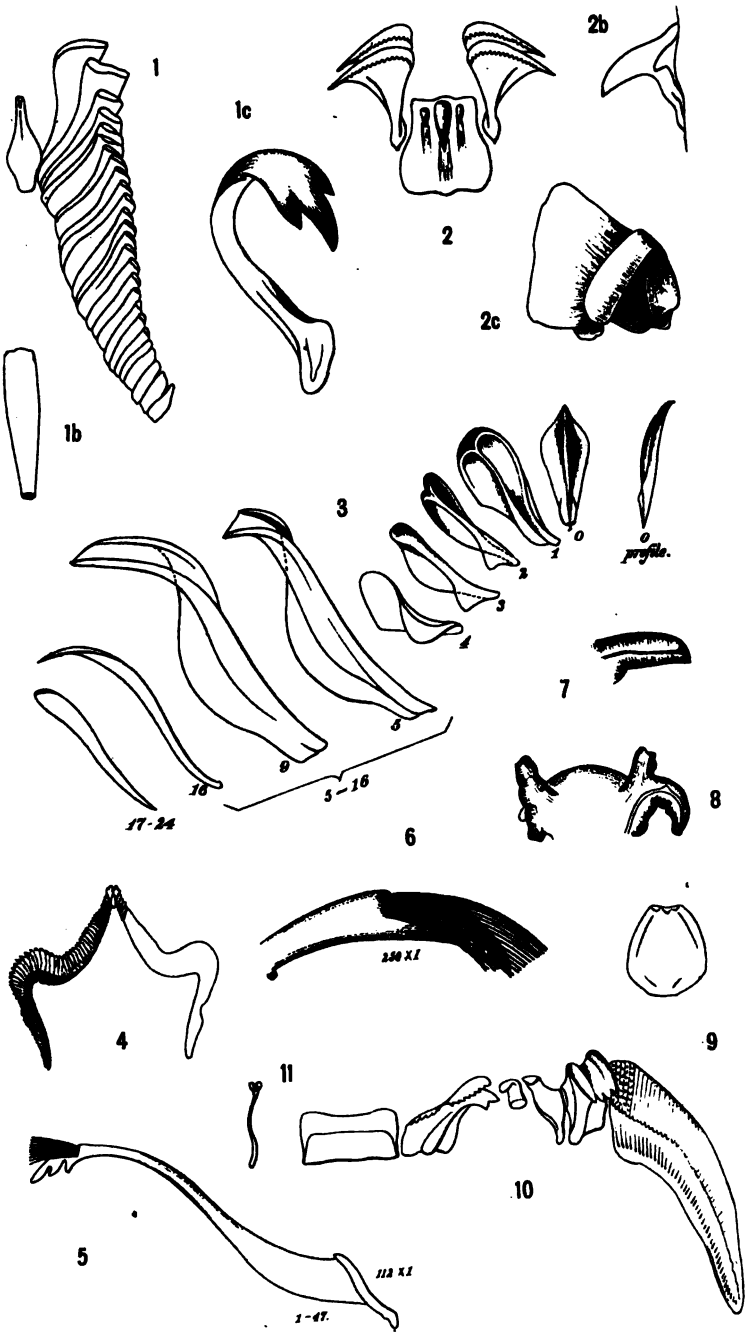

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Photo. Lith. by L. S. Punderson & Son, New Haven, Conn.

PLATE XXXII.

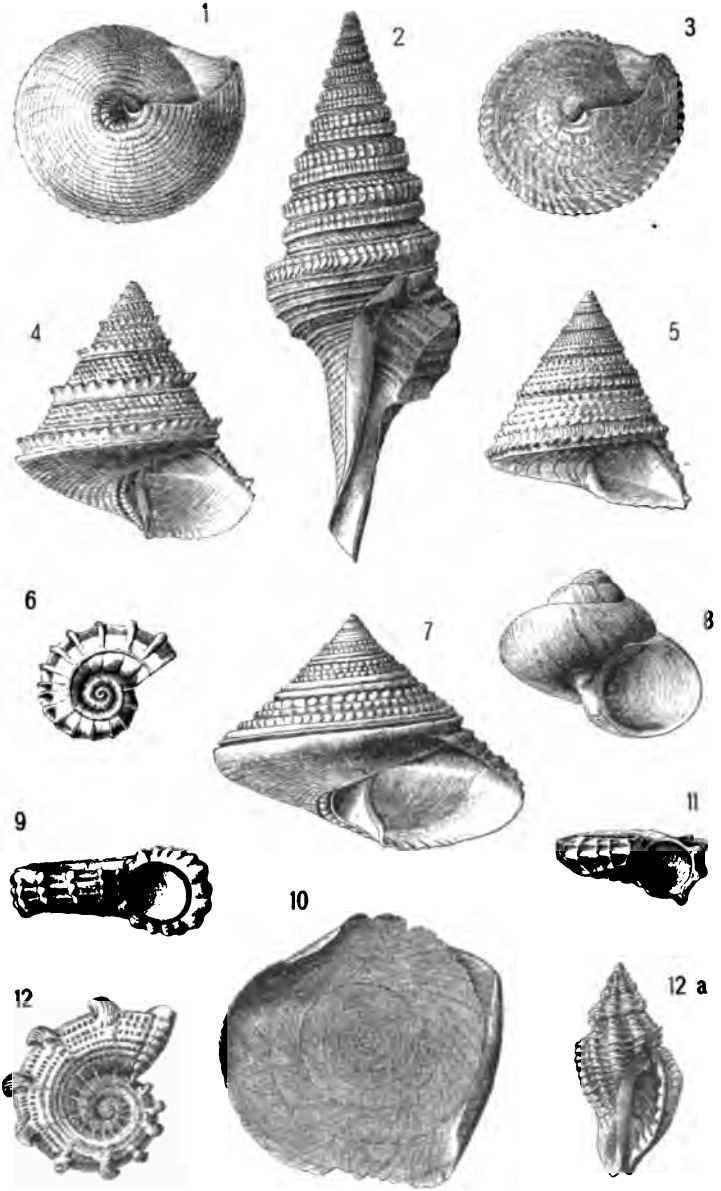

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Photo. Lith. by L. S. Punderson & Son, New Haven, Conn.

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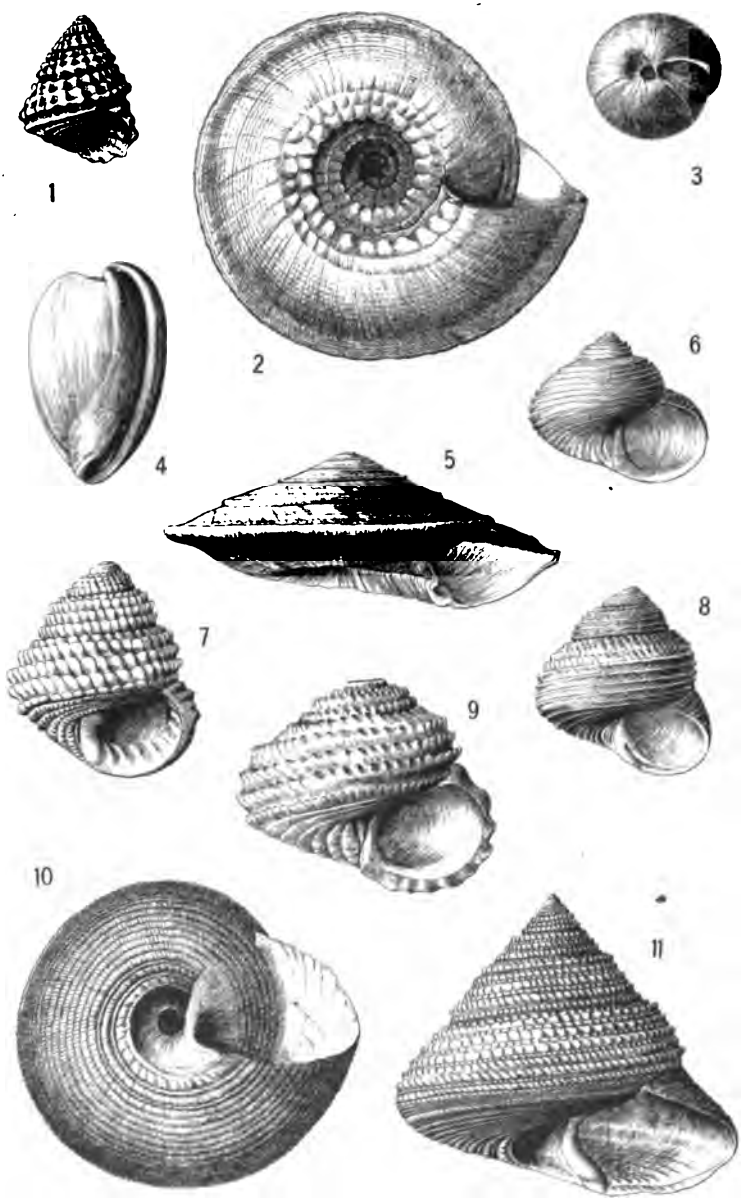

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Photo. Lith by L. S. Punderson & Son, New Haven, Conn.

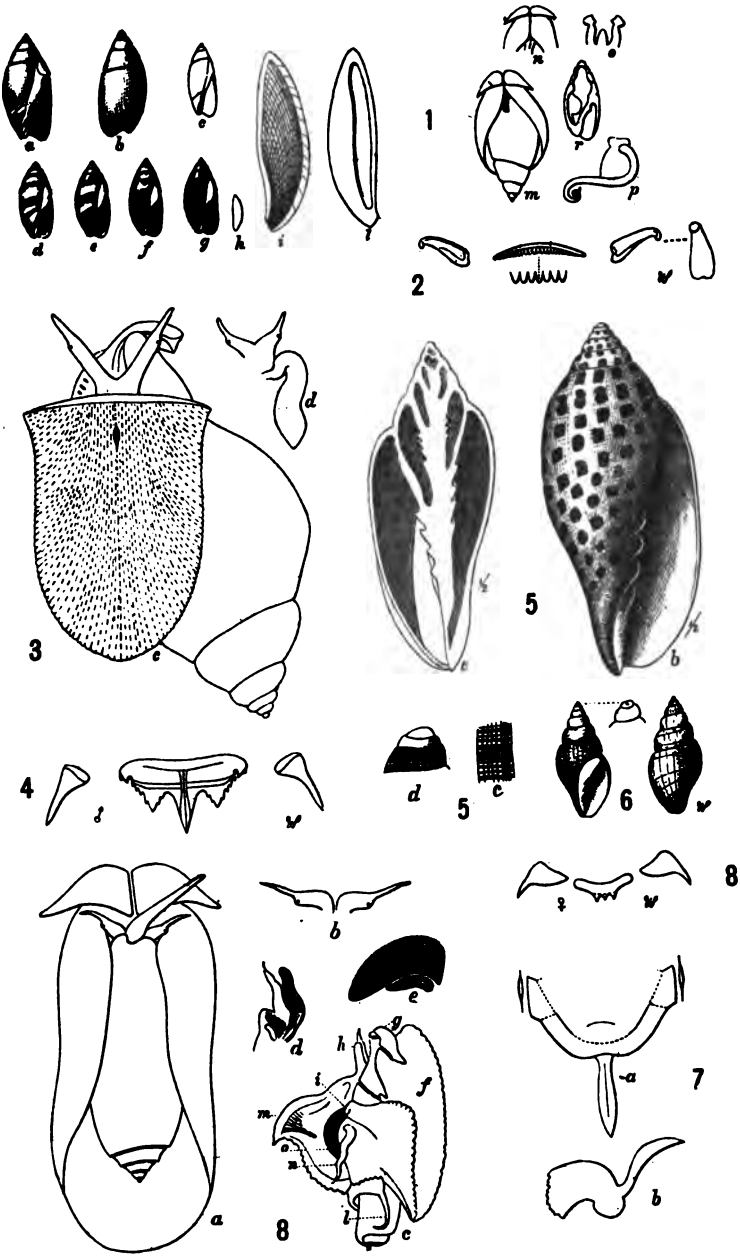

Photo. Lith. by L. S. Punderson & Son, New Haven, Conn.

PLATE XXXV.

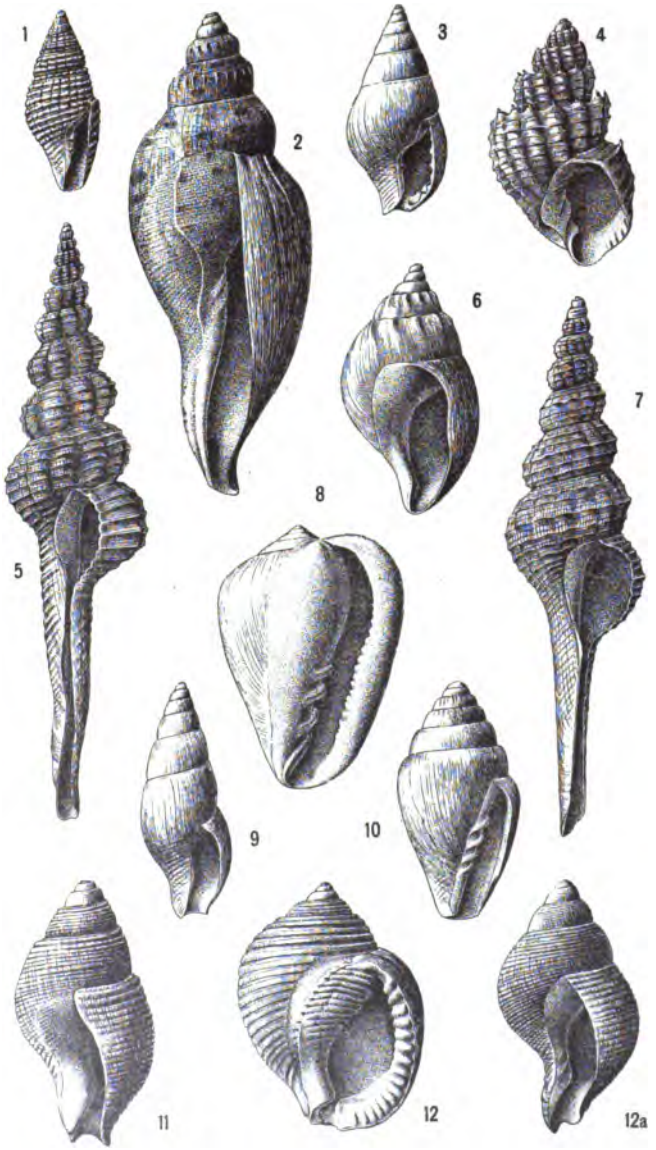

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Photo. Lith by L. S. Punderson & Son, New Haven, Conn.

PLATE XXXVI.

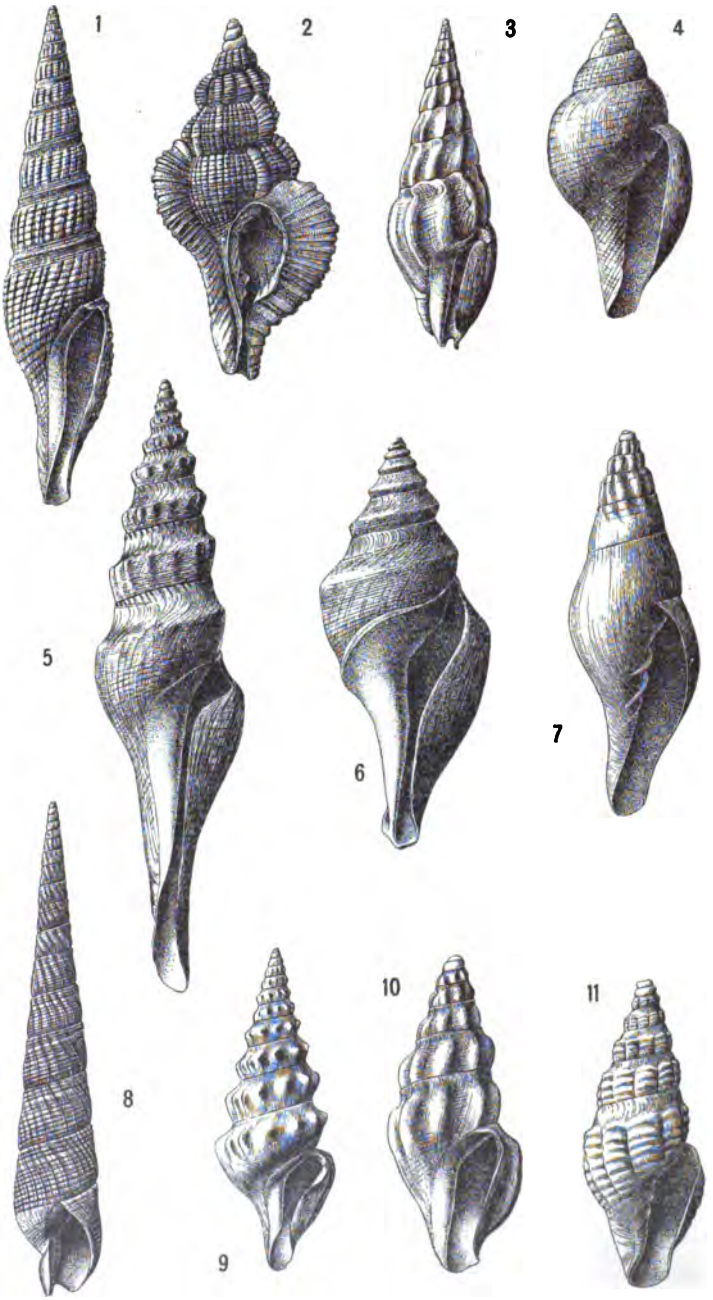

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Photo. Lith by L. S. Punderson & Son. New Haven, Conn.

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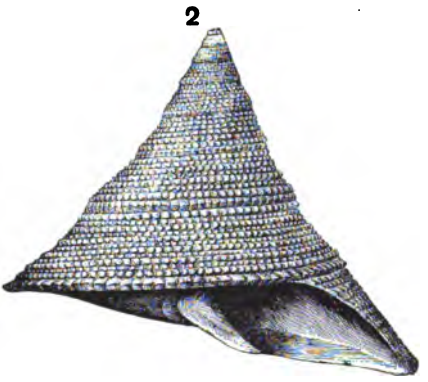

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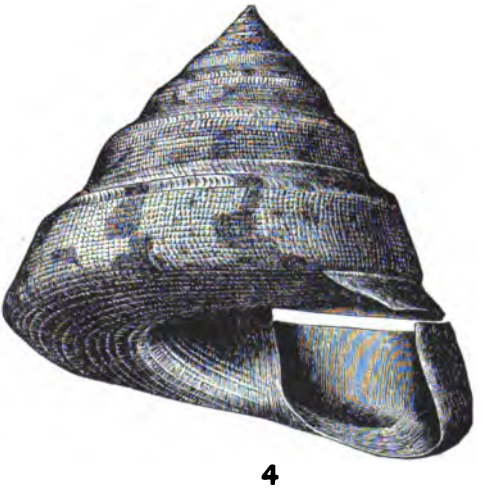

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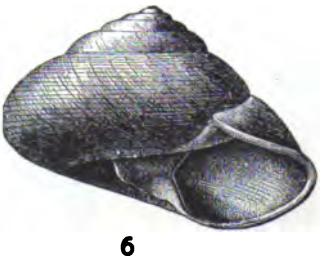

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McConnell del.

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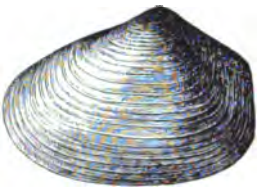

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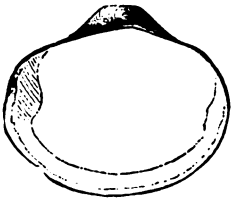

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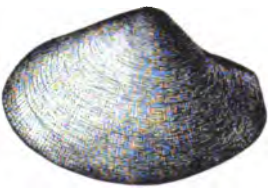

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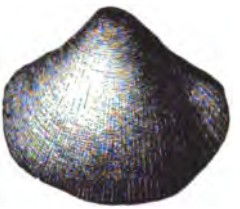

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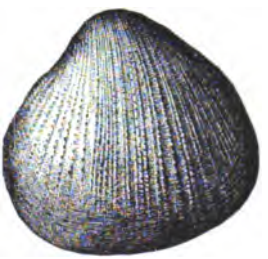

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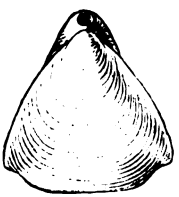

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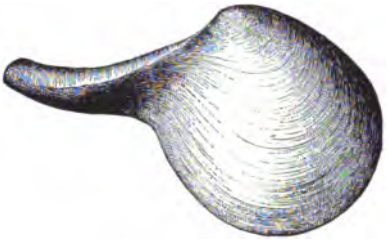

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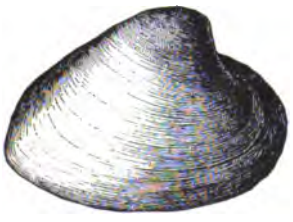

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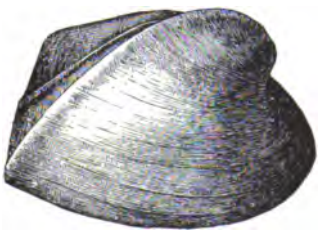

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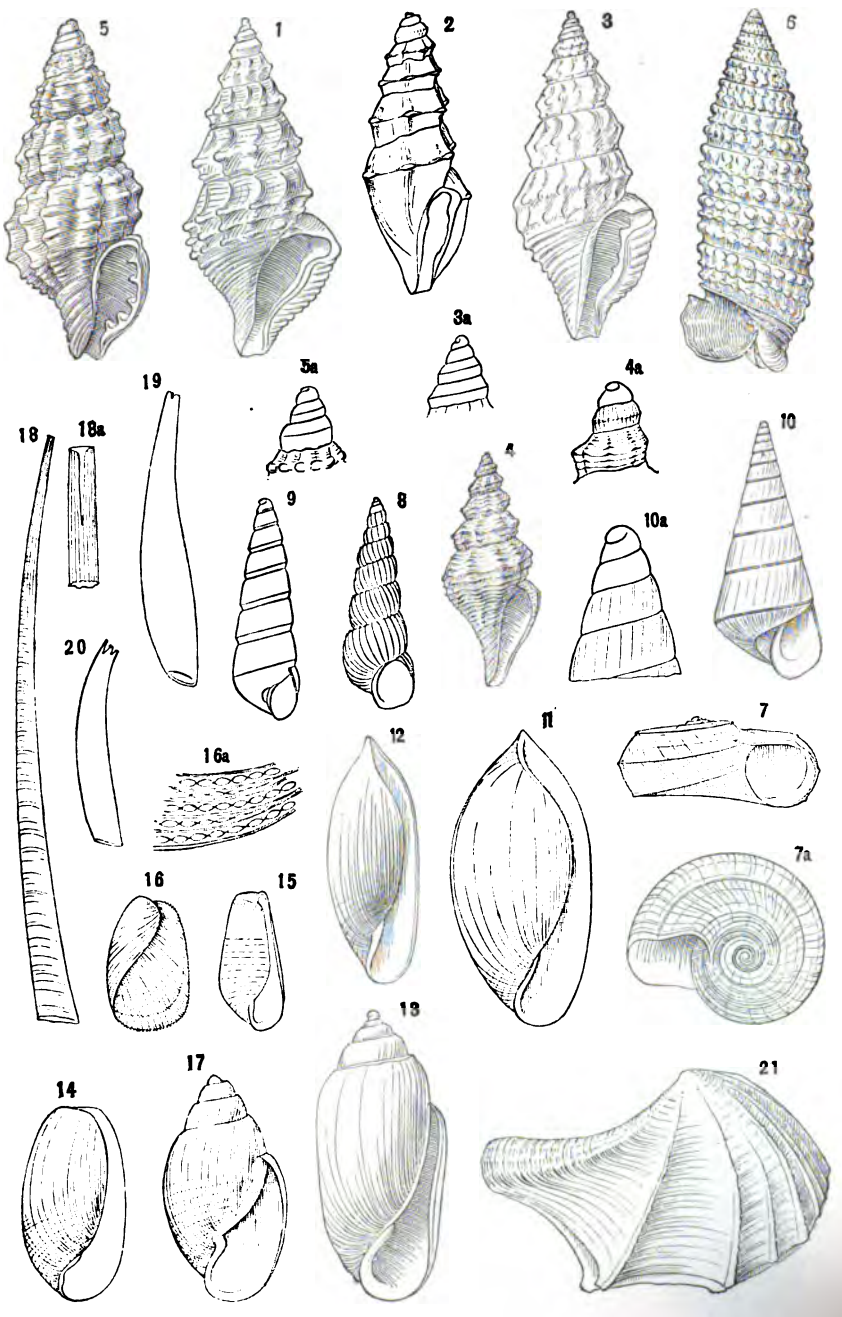
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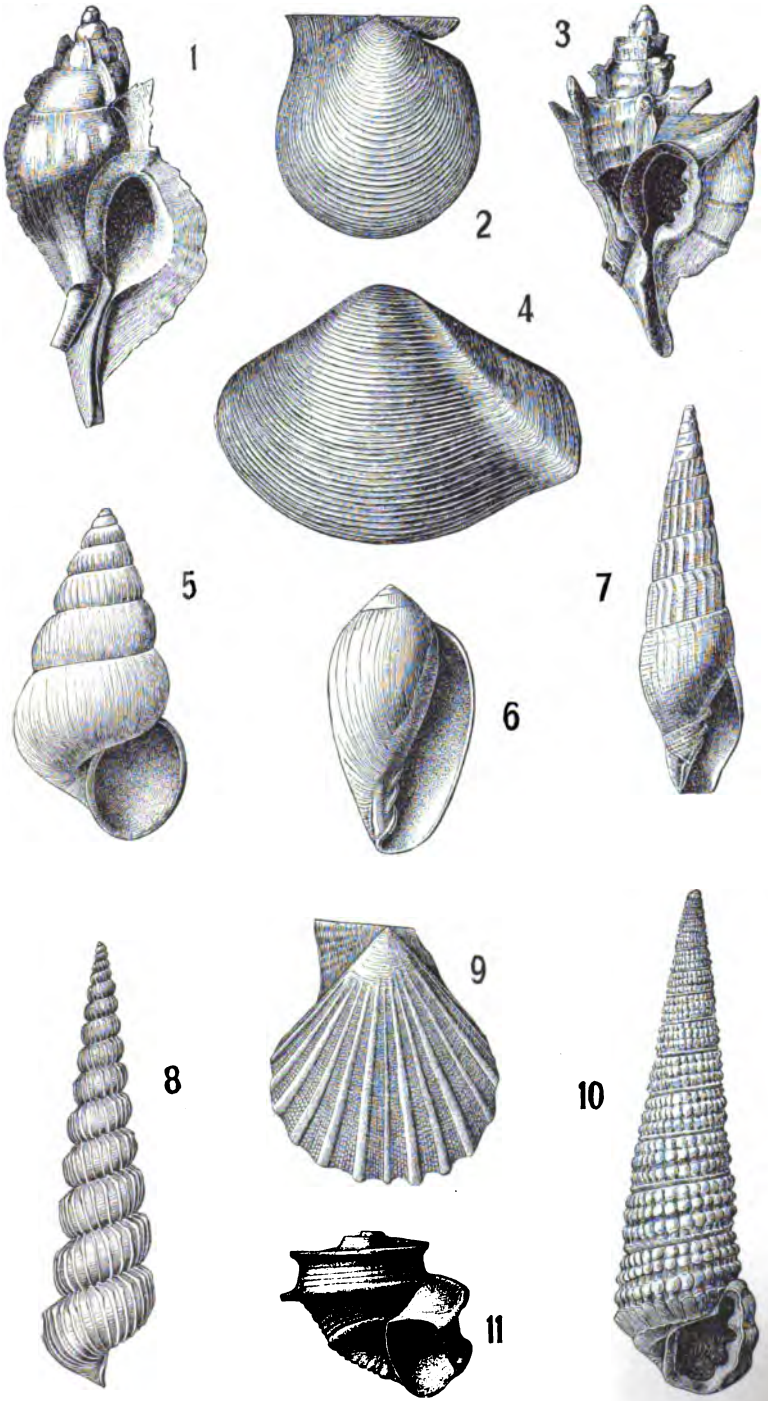
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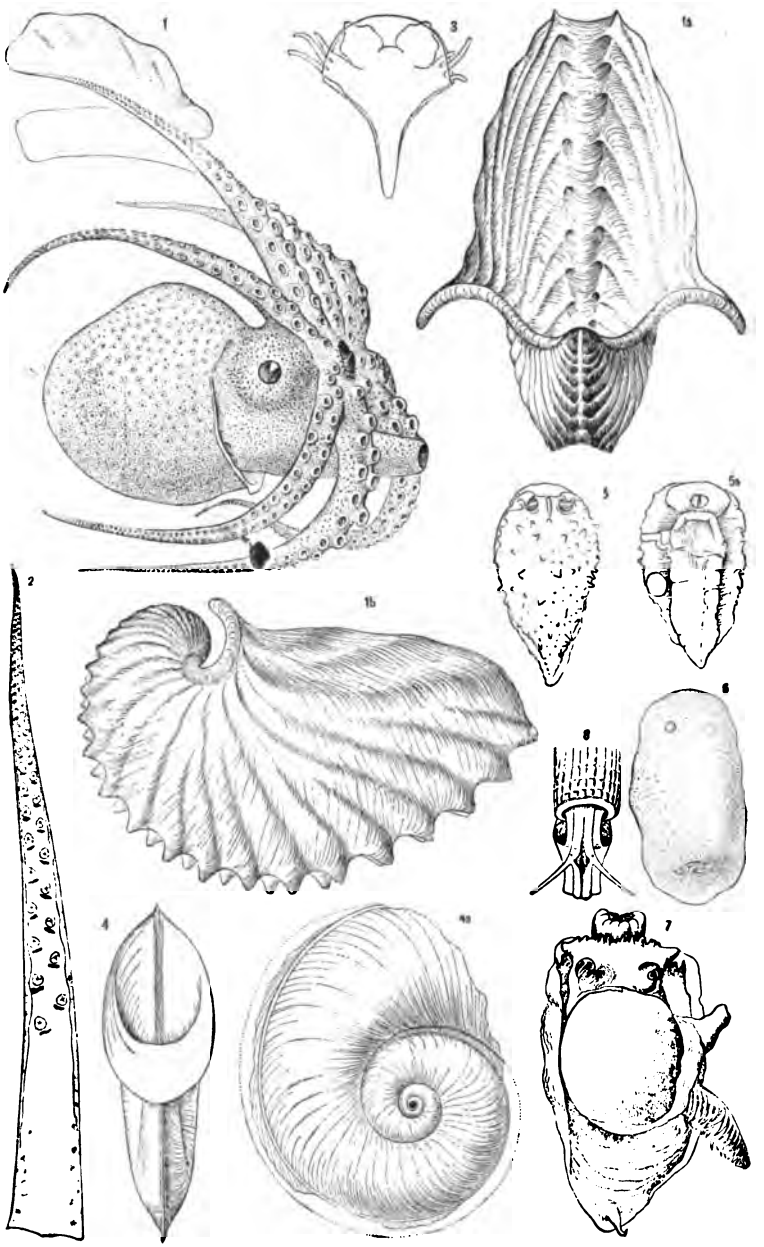
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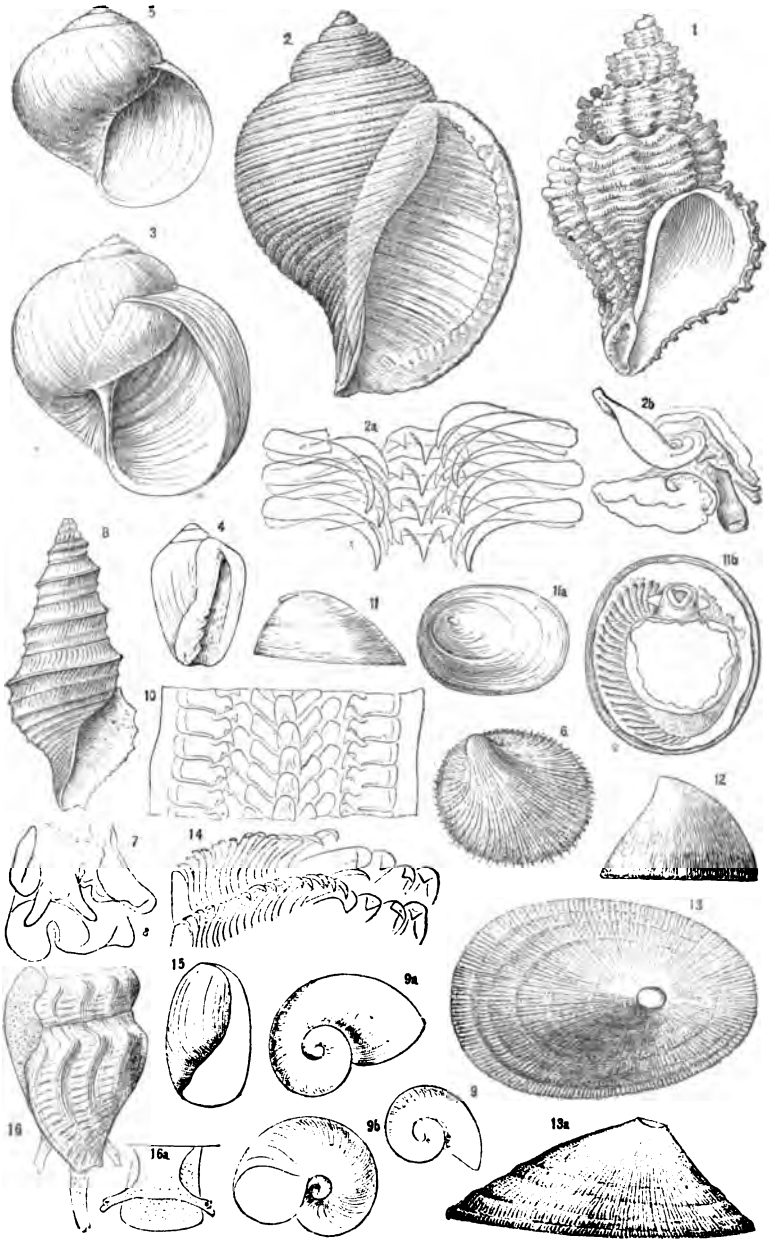
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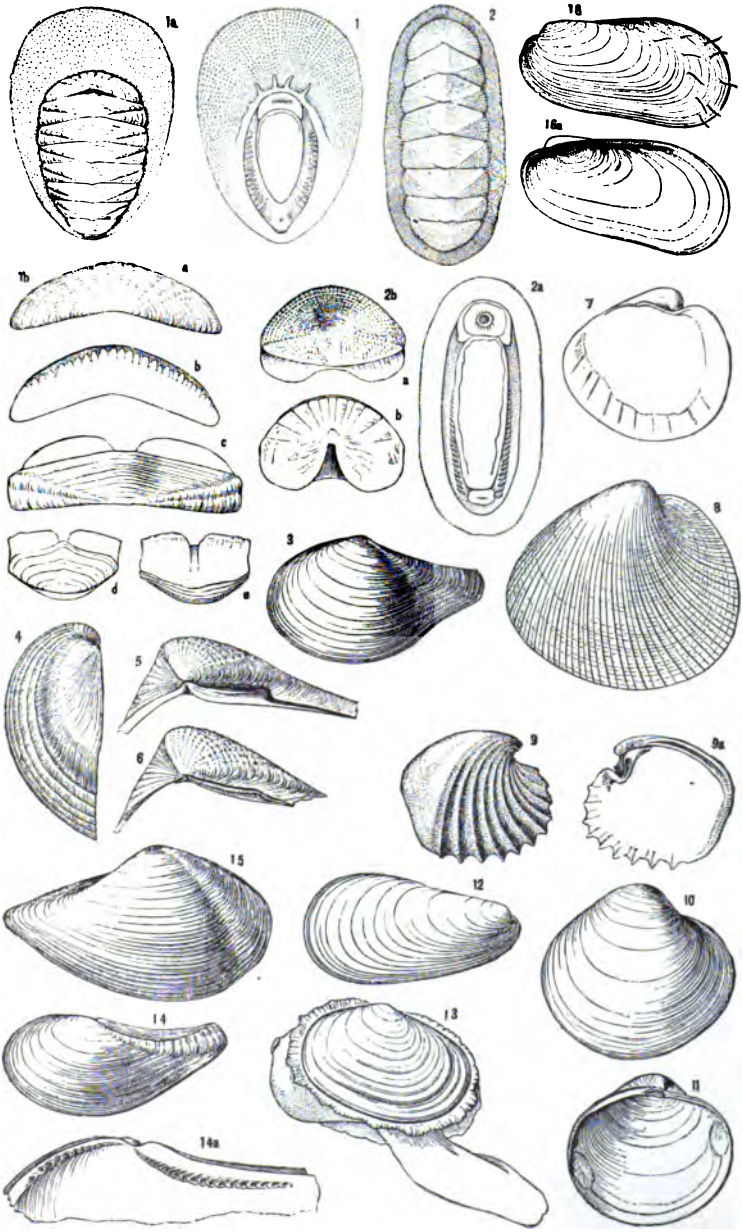
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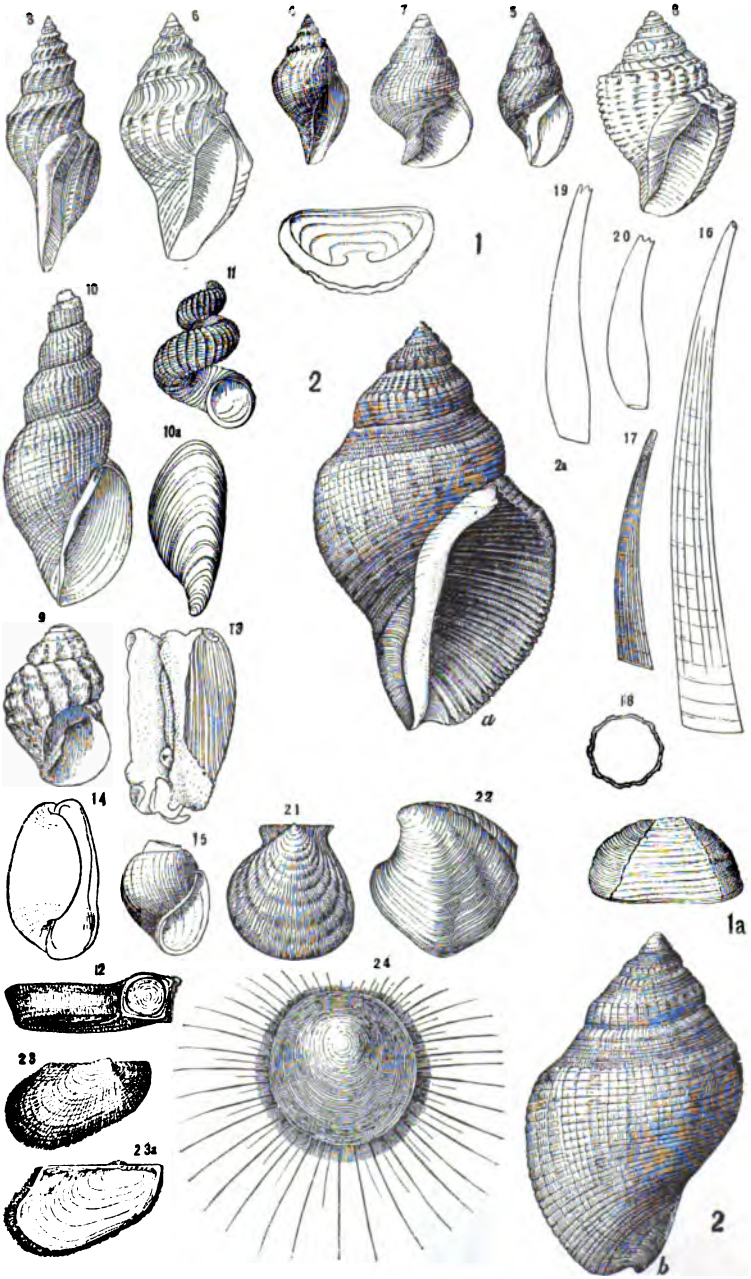
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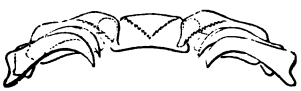
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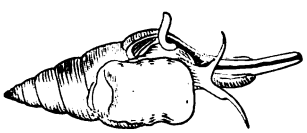
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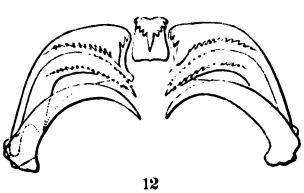
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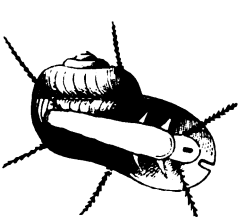
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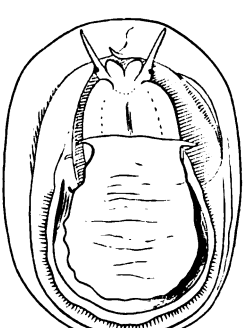
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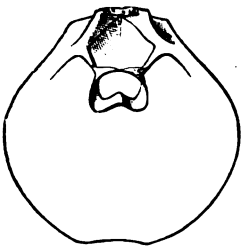

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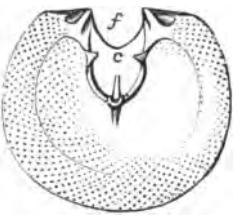

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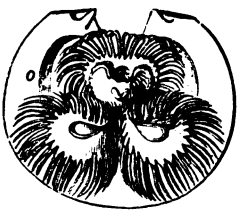

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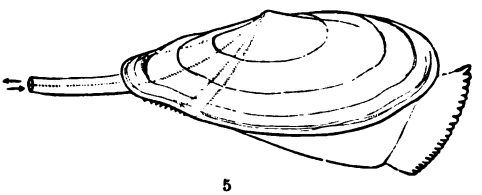

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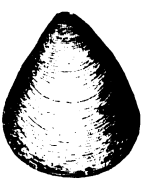

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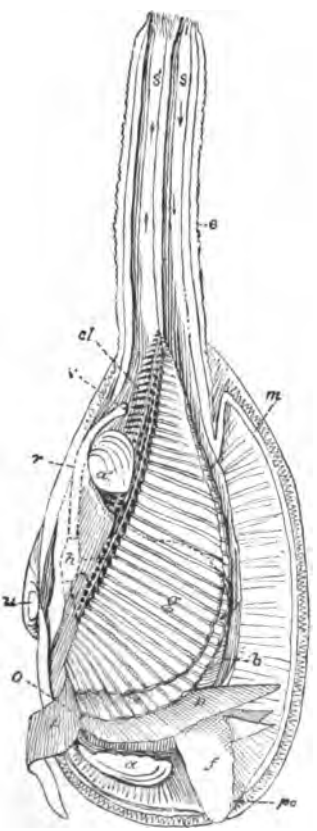

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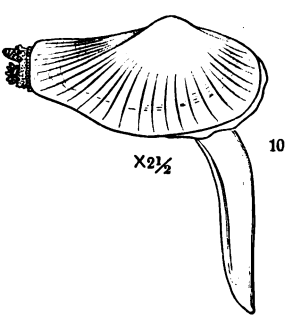

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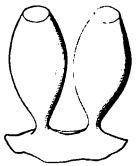
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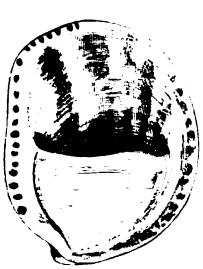
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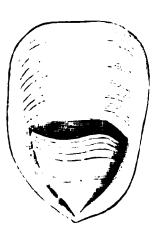
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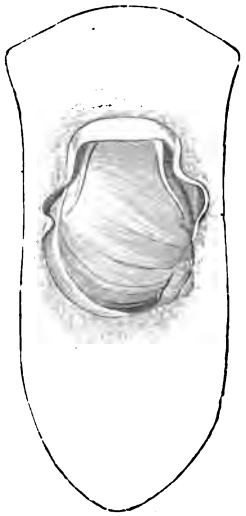

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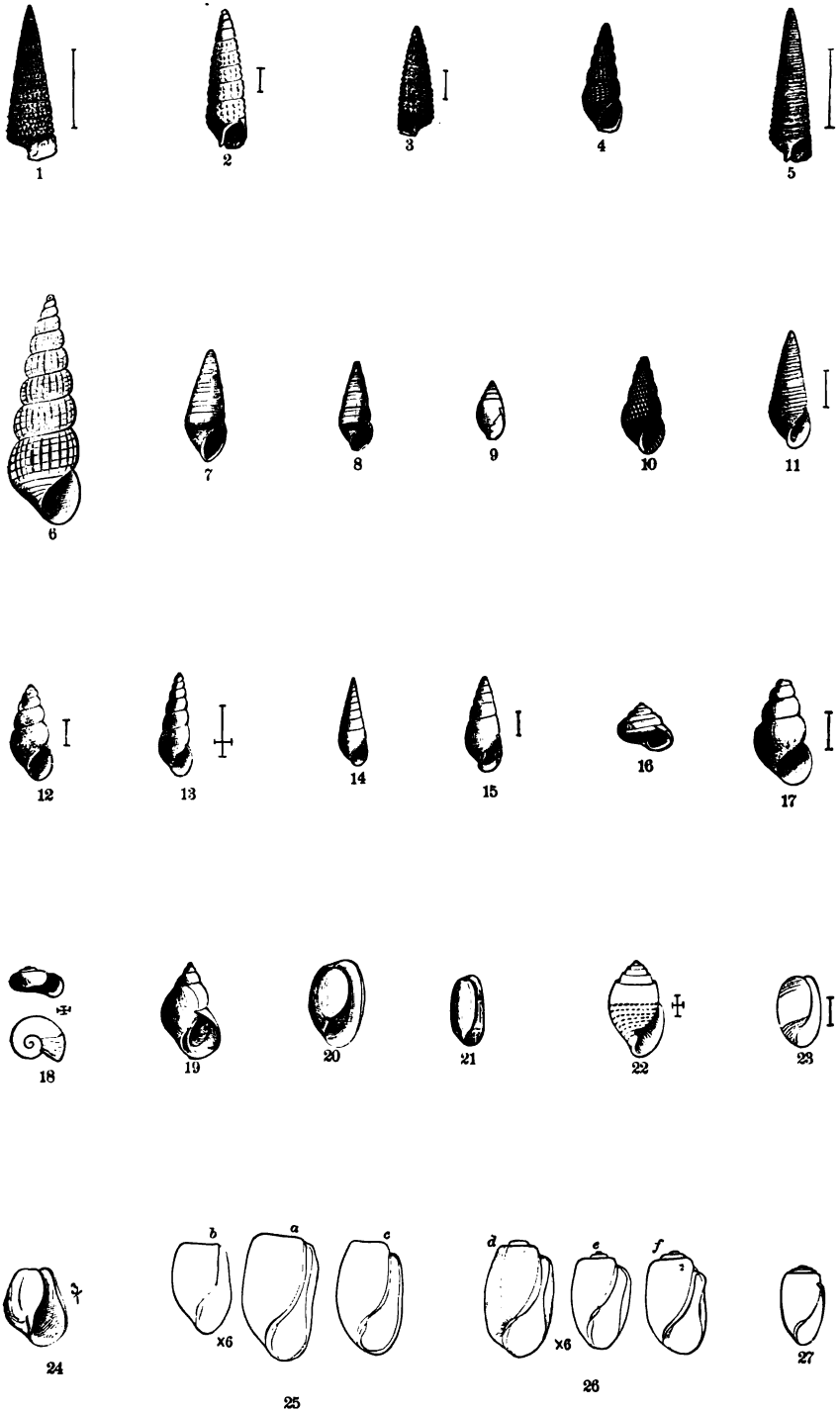
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a
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x6
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PLATE LIII.

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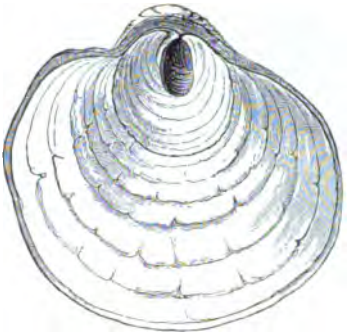

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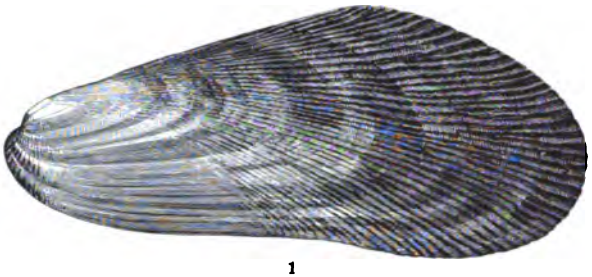

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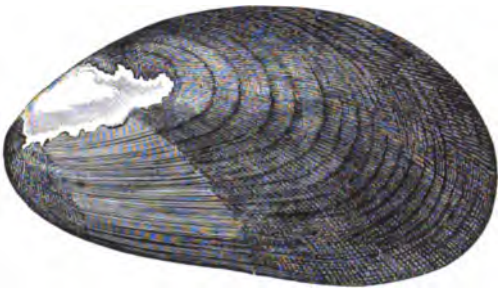

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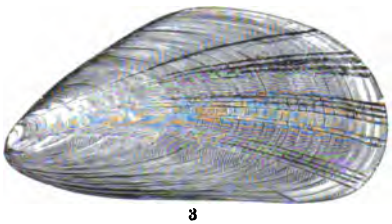

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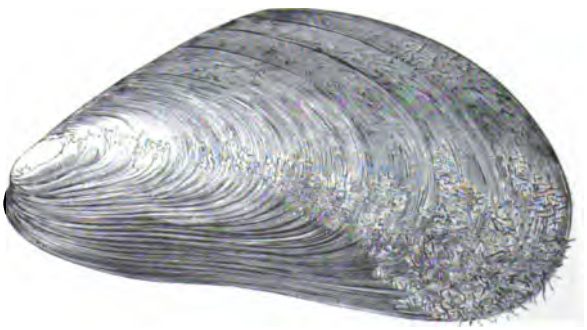

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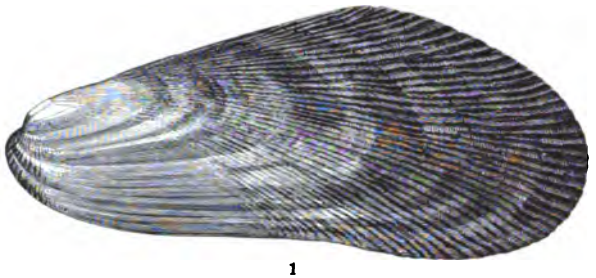

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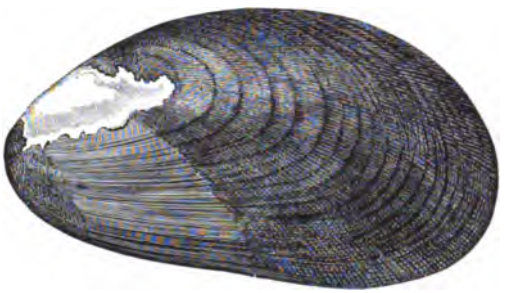

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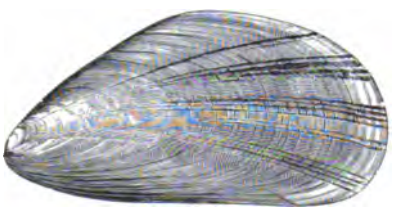

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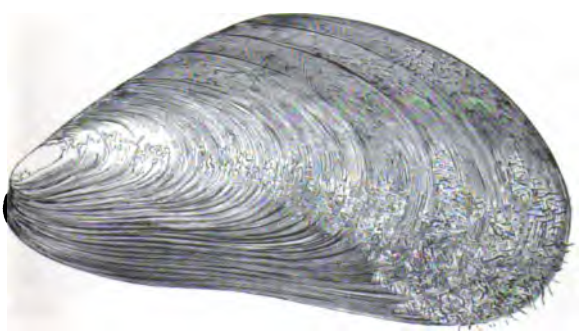

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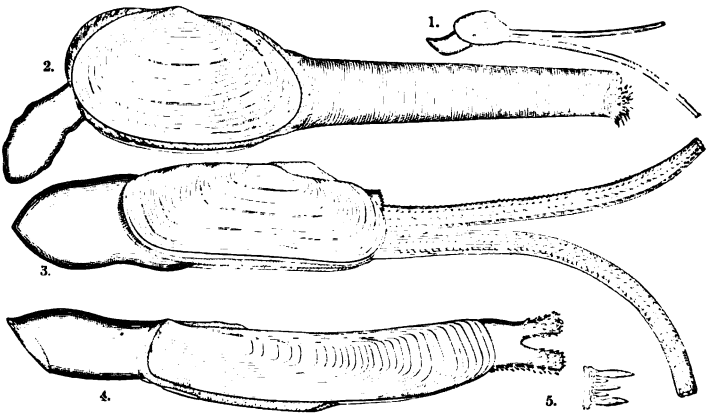

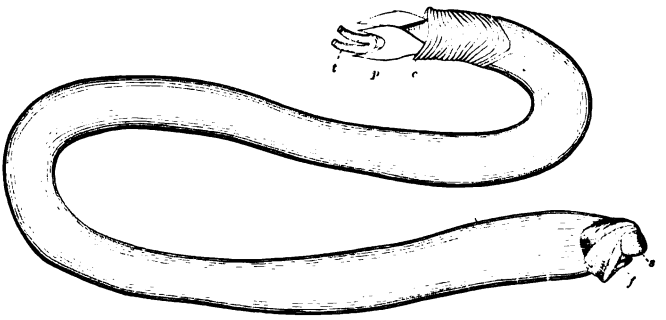

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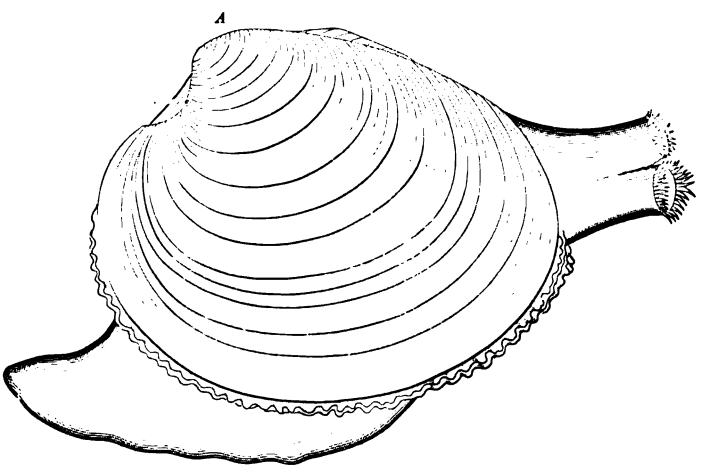

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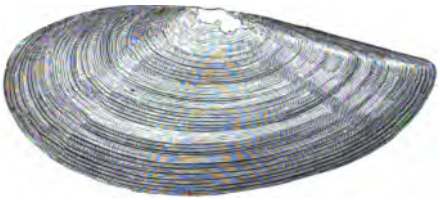
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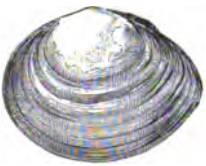
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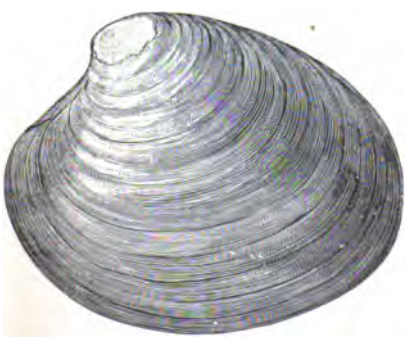
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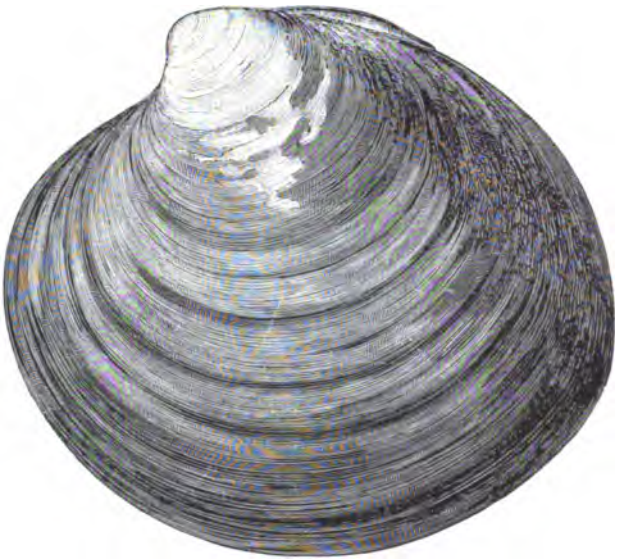

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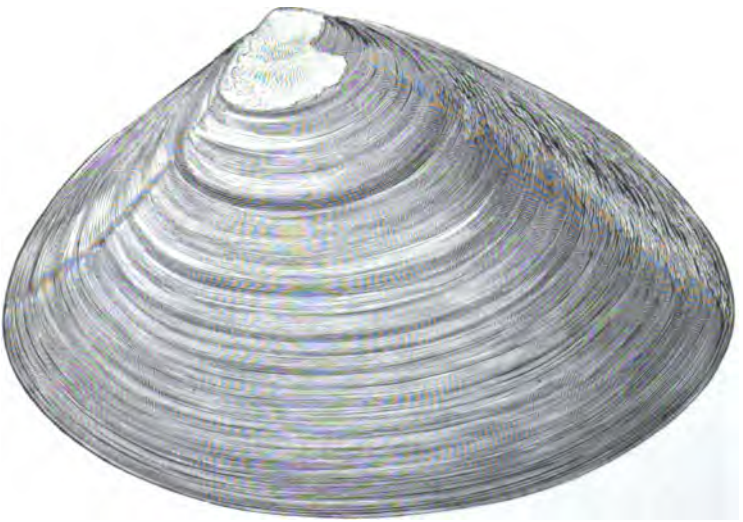

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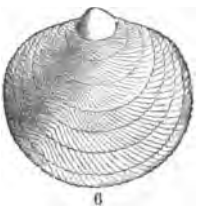
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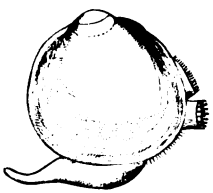
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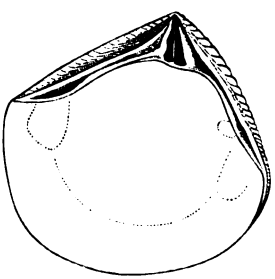
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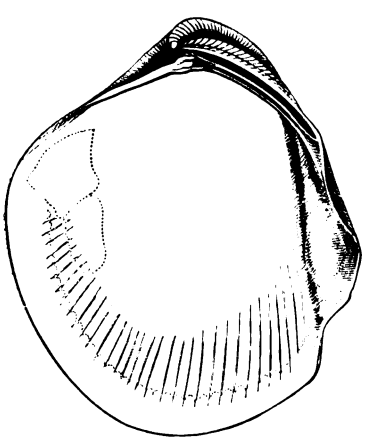
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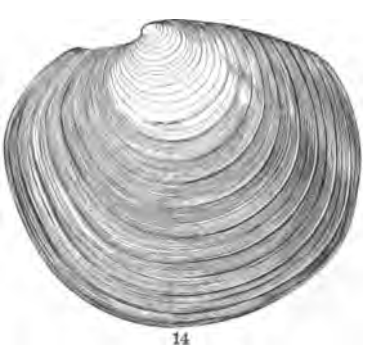
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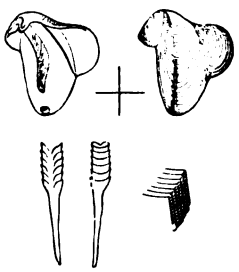

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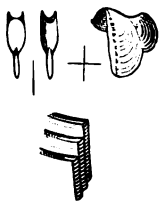

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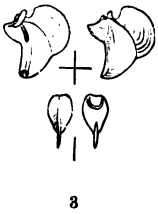

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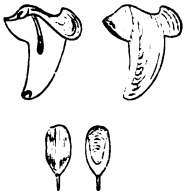

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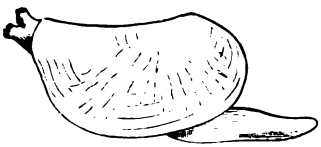

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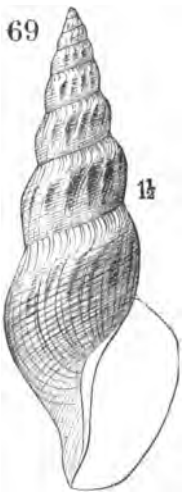
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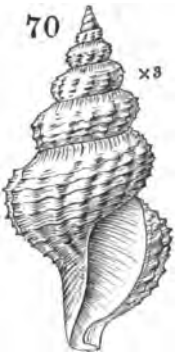
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71
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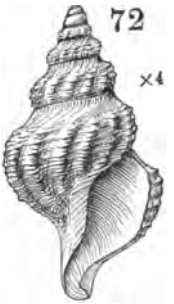
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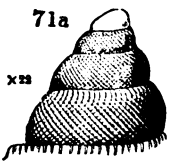
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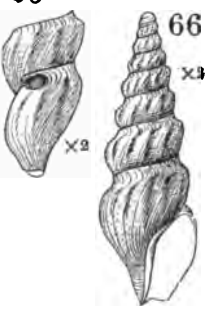
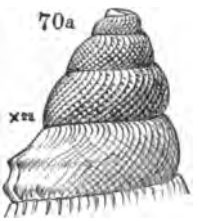

66a
×2
66
×3

73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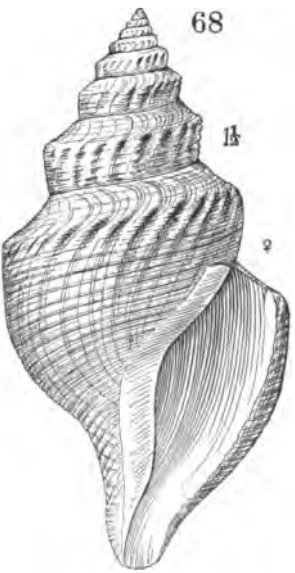
68
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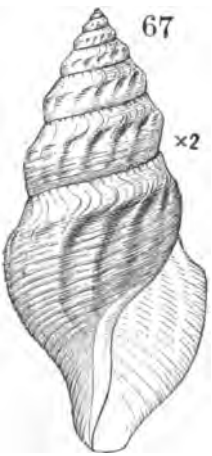
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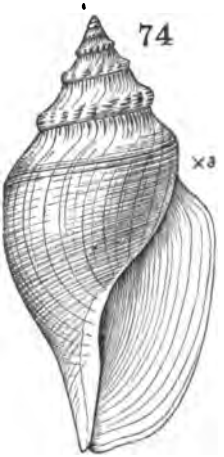
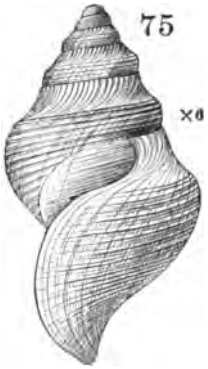

74
×3

PLATE LXI.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77
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76
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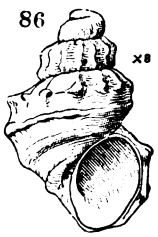
78
×3


86
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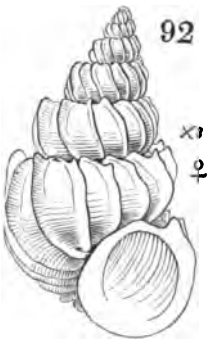
93
×6

76a
×22

82
×2

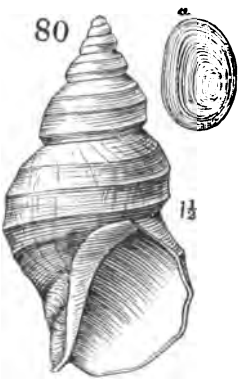

92
×1
2

94
×3

×3
79

81
1½

90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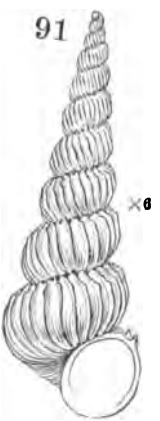
91
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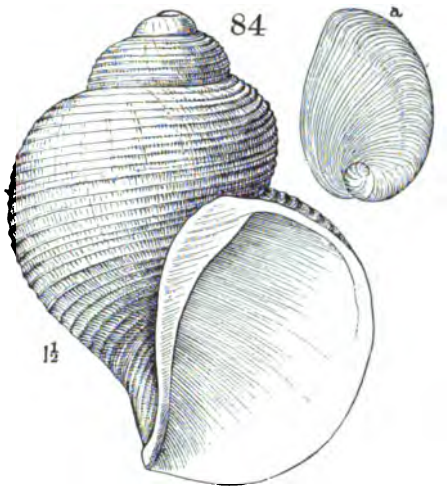
84
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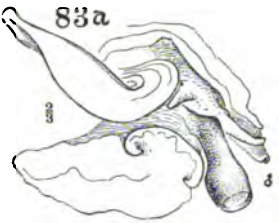
83a
2/3
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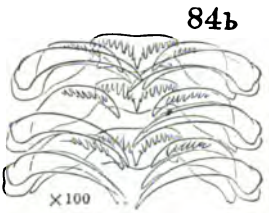
84b
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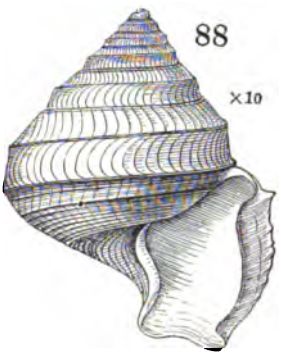
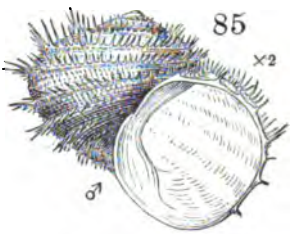

88
×10

88a


85
×2
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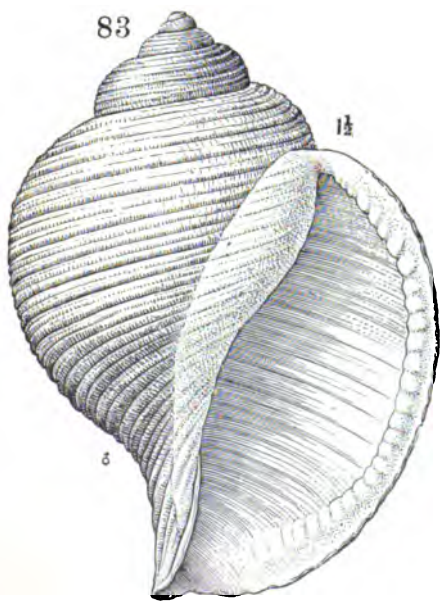
87
×8


83
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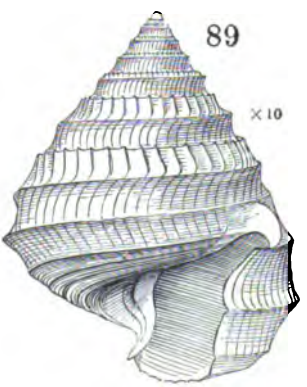
89
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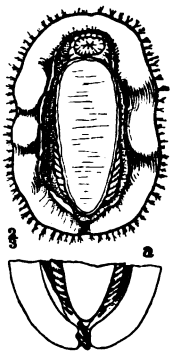
103
3a
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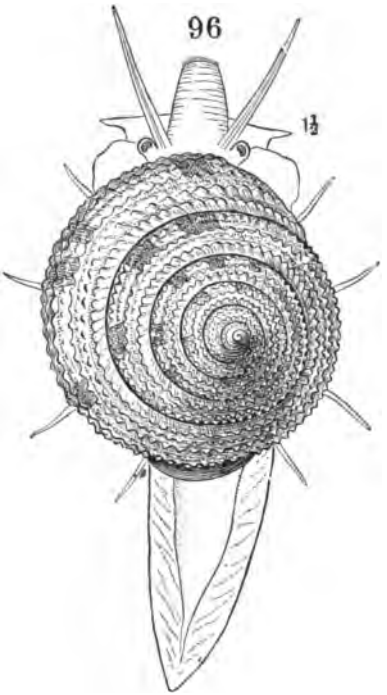
104
×4


96
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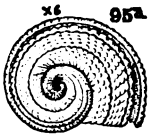
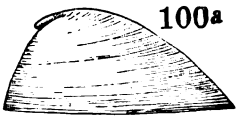
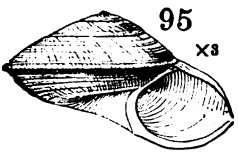
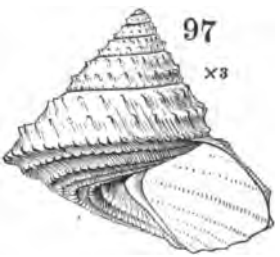
99
×10

101
×14

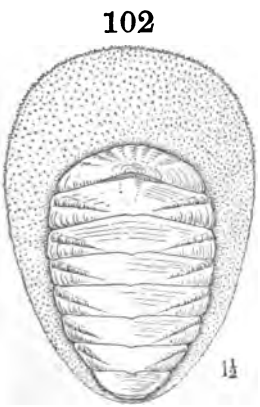

×6
95a


100a

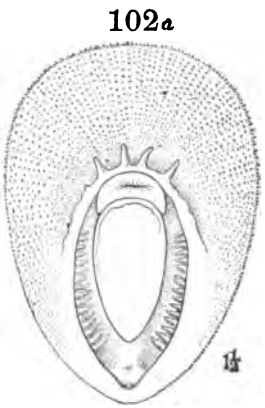

95
×3

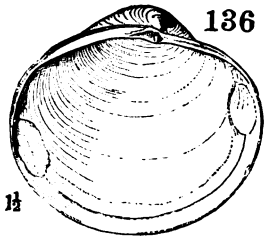

97
×3

98
×8

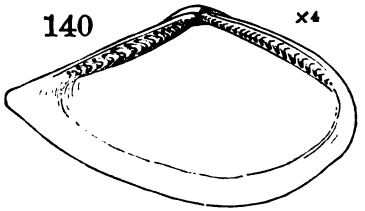

102
1½

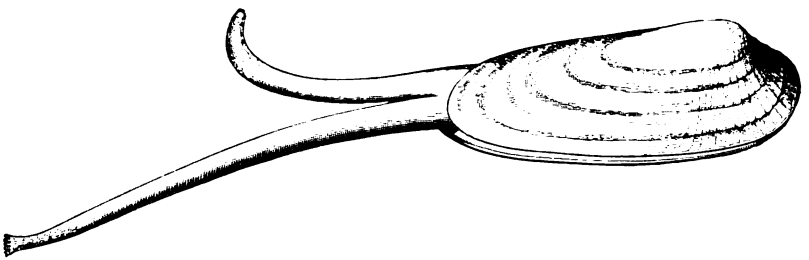
100
×3


102a
1½

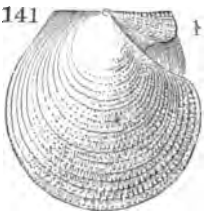


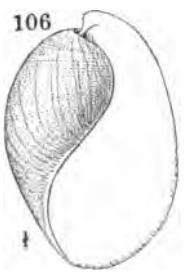
136*a*

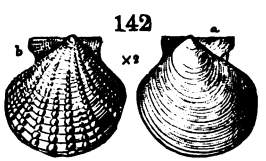


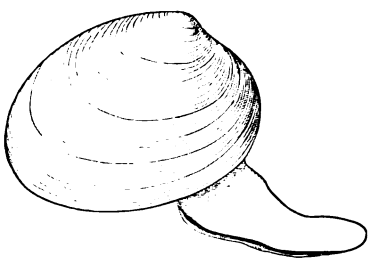


140*a*

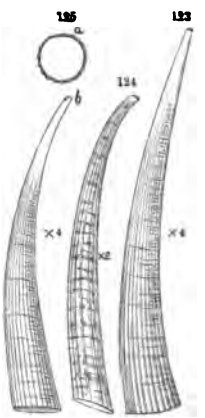


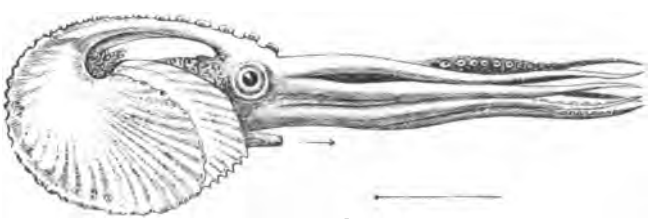






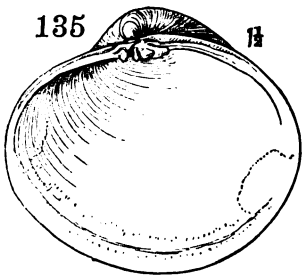
142*a*



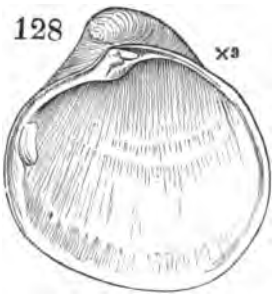


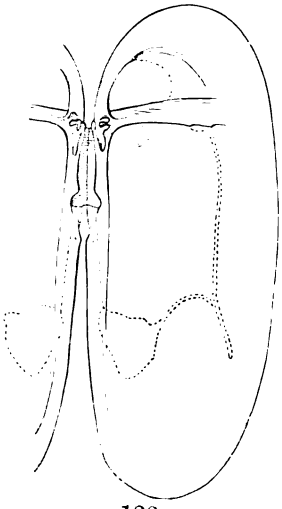
142*b*

PLATE LXV.

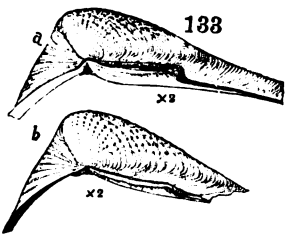

135
1½

127
1

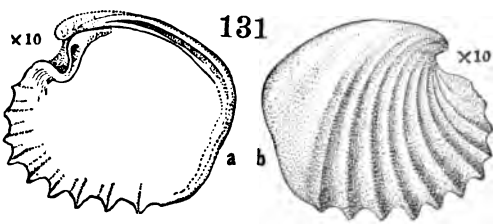

128
×3


128a

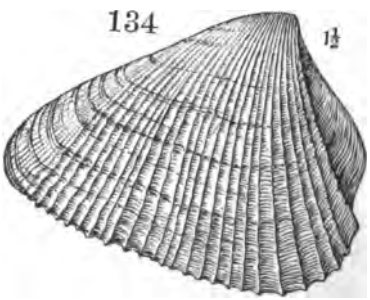
132
½

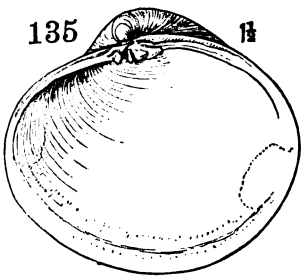

133
a
×3
b
×2

130
1½

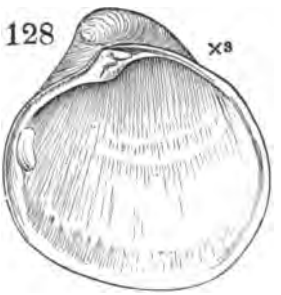

×10
131
a
b
×10

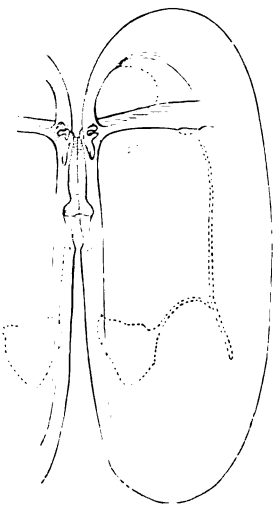
129
×3

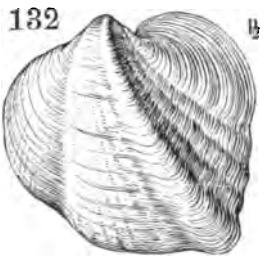

134
1½

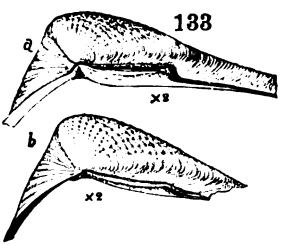

135
1½

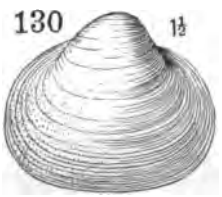
127
1

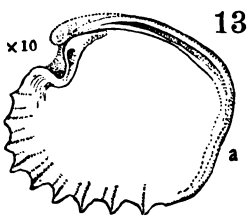

128
×3

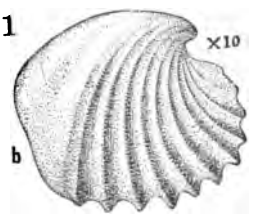

128a


132
½


133
a
×2
b
×2


130
½


×10
a


131
×10
b

129
×3

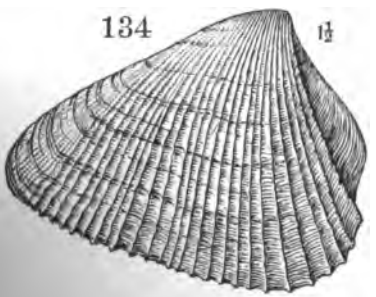
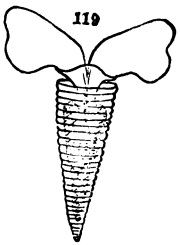
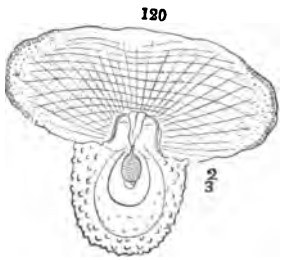
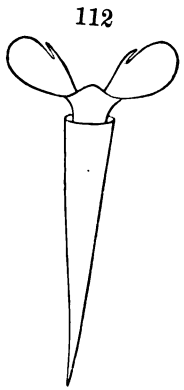
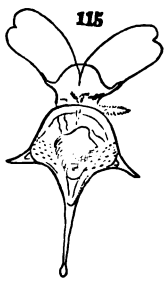

134
½

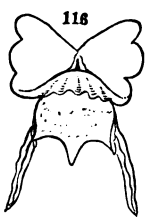
PLATE LXVI.

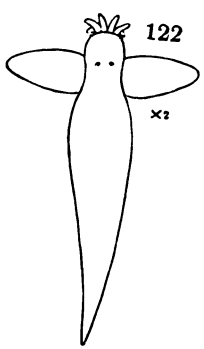


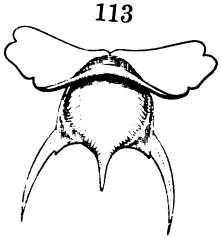


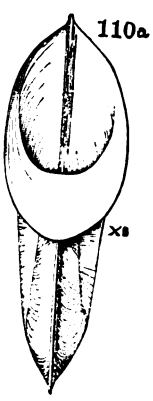


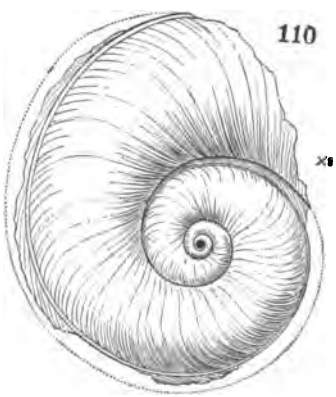


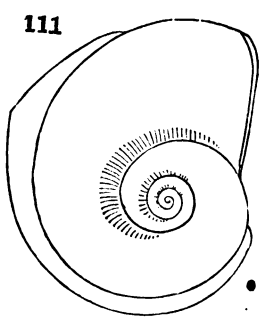


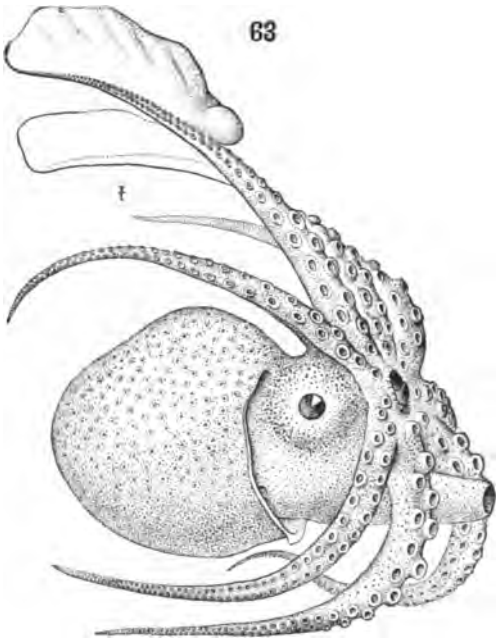


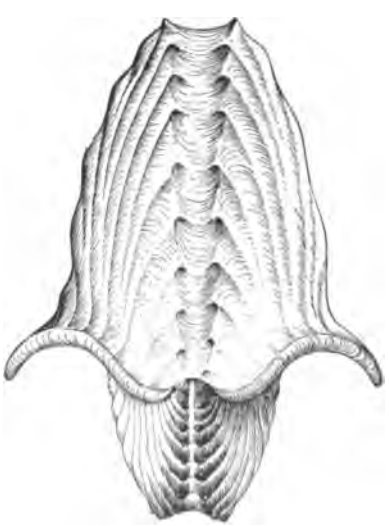


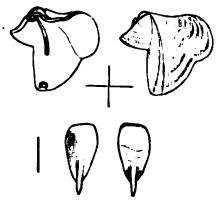




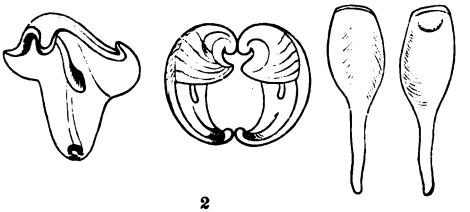



63

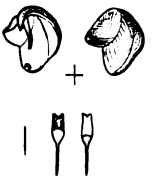




1



2



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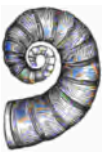

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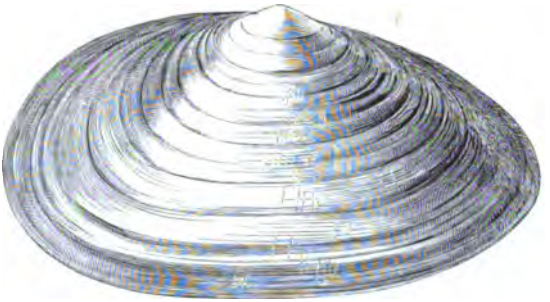
1



2

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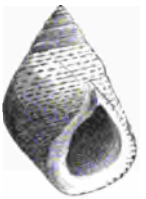
4

5



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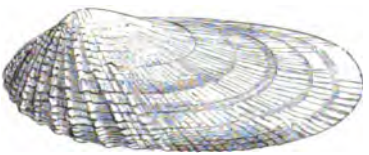
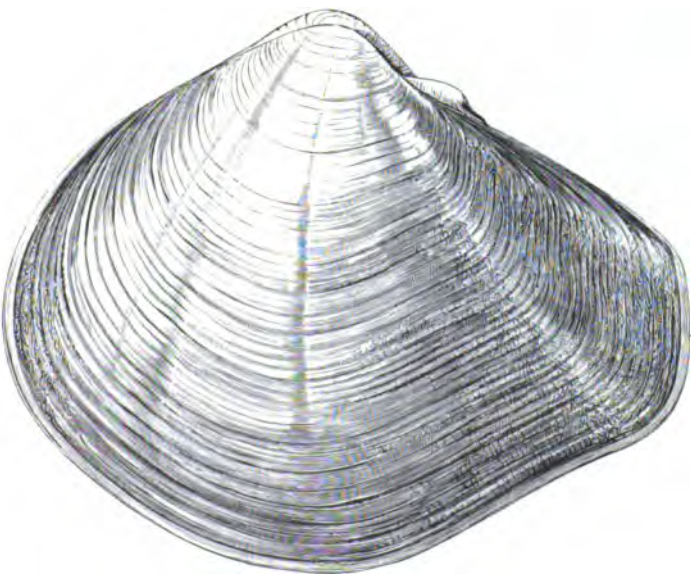
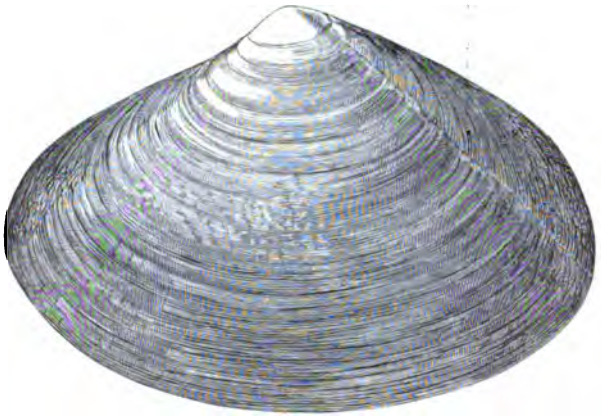


7

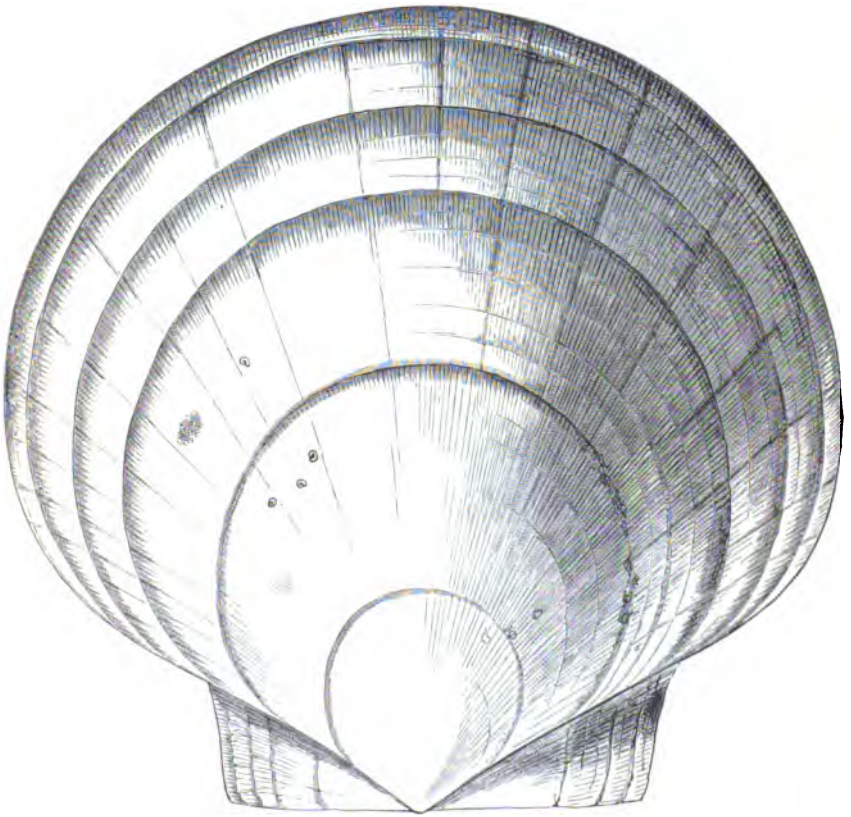
8



9



1



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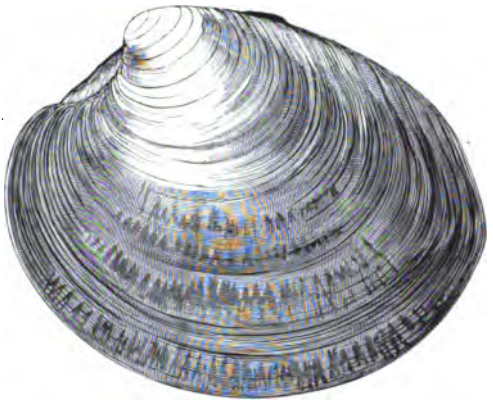
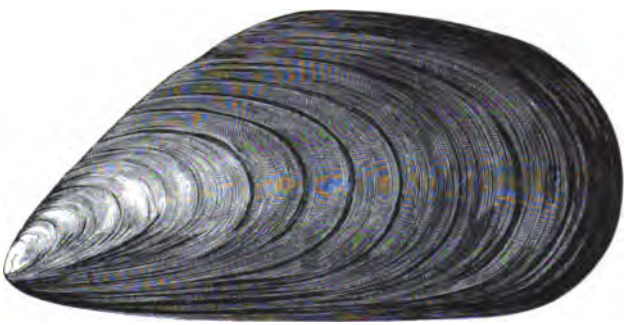


1



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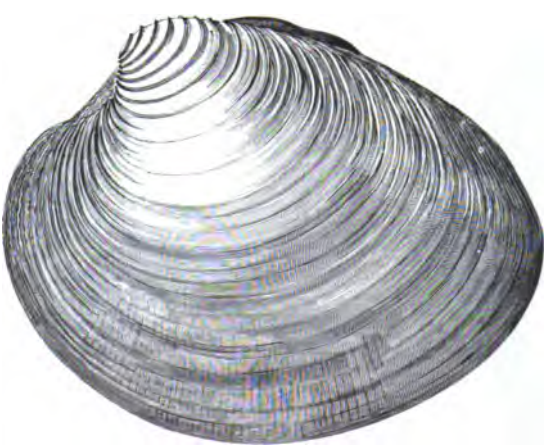

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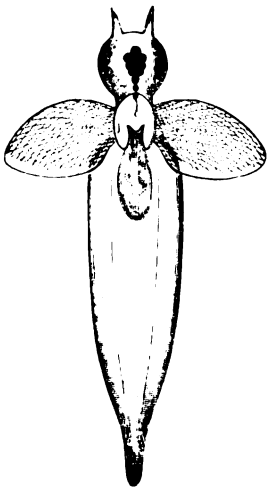

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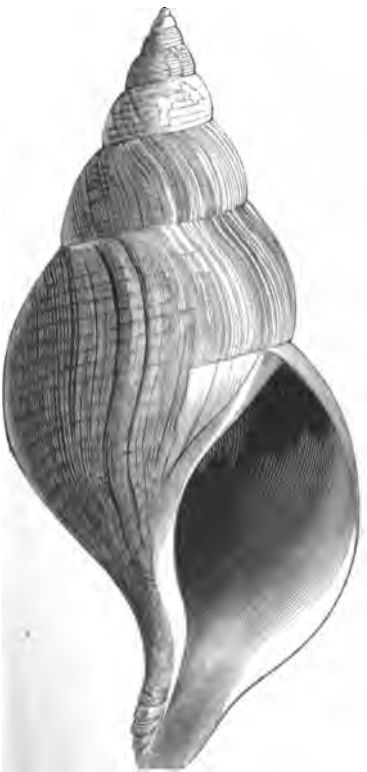

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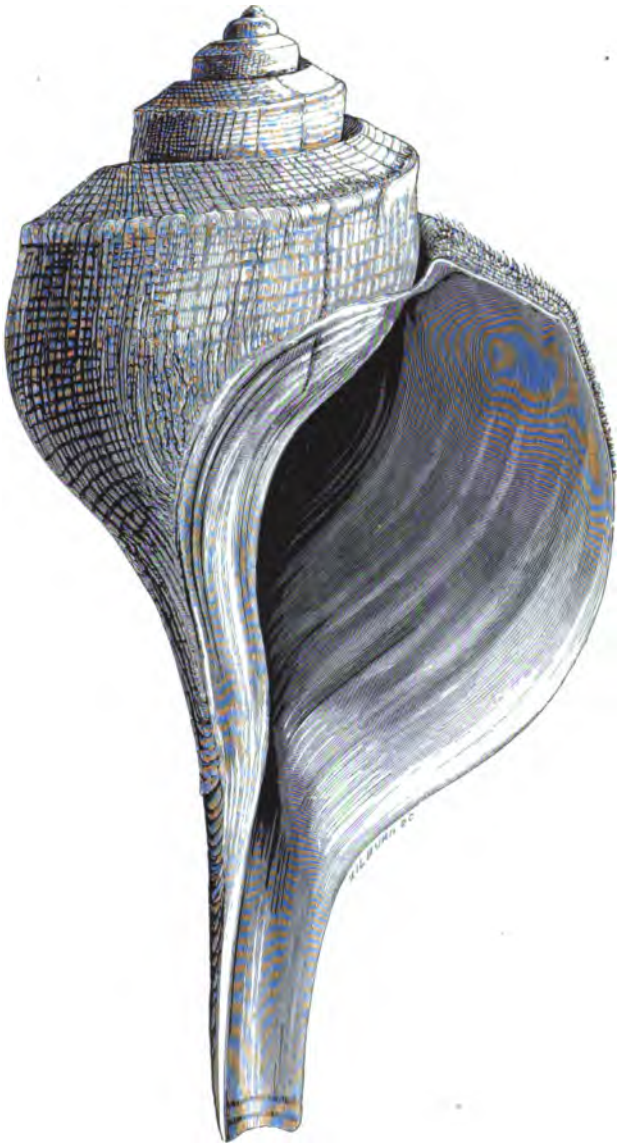

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SMITHSONIAN INSTITUTION.

UNITED STATES NATIONAL MUSEUM.

BULLETIN

OF THE

UNITED STATES NATIONAL MUSEUM.

No. 38.

CONTRIBUTION TOWARD A MONOGRAPH OF THE INSECTS OF THE LEPIDOPTEROUS FAMILY NOCTUIDÆ OF TEMPERATE NORTH AMERICA.—REVISION OF THE SPECIES OF THE GENUS AGROTIS.

BY

JOHN B. SMITH,

Professor of Entomology, Rutgers College, New Jersey.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1890.

ADVERTISEMENT.

This work (Bulletin No. 38) is the fifty-first of a series of papers intended to illustrate the collections of natural history and ethnology belonging to the United States, and constituting the National Museum, of which the Smithsonian Institution was placed in charge by the act of Congress of August 10, 1846.

The publications of the National Museum consist of two series—the Bulletins, of which this is No. 38, in continuous series, and the Proceedings, of which the thirteenth volume is now in press. A small edition of each paper in the Proceedings is distributed in pamphlet form to specialists in advance of the publication of the bound volume.

From time to time the publications of the Museum which have been issued separately are combined and reissued as volumes of the Miscellaneous Collections. These are struck off from the stereotype plates from which the first edition was printed, and in this form are distributed by the Smithsonian Institution to libraries and scientific societies throughout the the world. Volume 13 of these collections includes Bulletins 1 to 10, inclusive; volume 19, volumes 1 and 2 of the Proceedings; volume 22, volumes 3 and 4 of the Proceedings; and volume 23, Bulletins 11 to 15, inclusive.

Full lists of the publications of the Museum may be found in the current catalogues of the publications of the Smithsonian Institution.

Papers intended for publication in the Proceedings and Bulletins of the National Museum are referred to the Committee on Publications, consisting of the following members: T. H. Bean, A. Howard Clark (editor), Otis T. Mason, John Murdoch, Leonhard Stejneger, Frederick W. True, and Lester F. Ward.

S. P. LANGLEY,
Secretary of the Smithsonian Institution.

WASHINGTON, *June* 1, 1890.

CONTRIBUTION TOWARD A MONOGRAPH

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OF

TEMPERATE NORTH AMERICA.

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WITH FIVE PLATES.

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1890.

LETTER OF TRANSMITTAL.

SMITHSONIAN INSTITUTION,
UNITED STATES NATIONAL MUSEUM,
Washington, March 17, 1890.

Prof. G. BROWN GOODE,
Assistant Secretary Smithsonian Institution,
In charge of National Museum:

SIR: I have the honor to transmit the accompanying paper, which was largely prepared by Professor Smith while associated with me, and was, in fact, begun with the intention of publishing a conjoint and complete monograph. My time having been too much occupied otherwise, the original plan was abandoned, and I turned the matter all over to him when he left the Museum with the understanding that he would finish individually the synoptic and descriptive parts. The result is the present paper, and I strongly recommend that it be published as a Bulletin of the Museum.

Sincerely yours,

C. V. RILEY,
Curator of Insects.

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CONTRIBUTION TOWARD A MONOGRAPH OF THE INSECTS OF THE LEPIDOPTEROUS FAMILY NOCTUIDÆ OF TEMPERATE NORTH AMERICA.—REVISION OF THE SPECIES OF THE GENUS AGROTIS.

The genus *Agrotis* embraces moths of medium size as a rule, and many of them of the typical "Owlet" type. The caterpillars of many of the species are very injurious to cultivated plants, and come under the general head of "Cut-Worms," a name given them from their habit of cutting off, just at the surface of the ground, the plants upon which they feed. The genus *Agrotis*, our American species alone considered, has but two characters common to all forms: the eyes are naked and the middle and posterior tibiæ are always spinose! Beyond this, and exclusive of the family characters, there is the widest possible divergence in structure. The head may be rather small, retracted, buried in the vestiture, or it may be large and distinct; the eyes may be large and prominent, or they may be small and reniform; the front may be flat or bulging, smooth or roughened, or with a tuberculate protuberance; the palpi may be short and weak, long and slender, smoothly scaled or moderate, robust, with heavy vestiture, making the second joint appear more or less clavate. The tongue is always at least moderately strong, as is the case usually in the *Noctuidæ*. The *antennæ* may be entirely simple in both sexes, or the male may have them ciliated merely, serrated with lateral bristly tufts, or they may be lengthily pectinated. The thorax may be depressed above, flattened, or it may be robust, strongly convex; the vestiture may be scaly or hairy or a mixture of both; it may be smooth, flattened, glistening, or it may be rough, divergent, and loose; it may form a basal tuft merely, an anterior and posterior tuft, a simple ridge like, or divided anterior crest, or it may have the anterior divided crest and posterior tuftings as well. The abdomen may be depressed, flattened, truncated posteriorly, or it may be stout, cylindric, conic, with pointed tip. The middle and posterior tibiæ are always spinose; the anterior tibiæ may be entirely unarmed, they may be sparsely spinose, heavily spined at sides and tip, of full length, or shortened, broad, and flat. The primaries may be long and narrow, short and wide, apices rounded or apices produced. In habitus they may be somber, depressed, resembling *Xylina*, or they may be bright, lively in colors, resembling *Heliothis*. Some are strictly

nocturnal in habit, hiding under bark and in crevices during the day; others are largely diurnal, flying in the bright sunshine, visiting flowers, and not so usually taken at night.

The generic term *Agrotis* therefore conveys no distinct impression, and it could only result in a huge assemblage of species through which no path was visible and in which identification to any but the specialist or to one with a large collection was all but impossible. Vague efforts have been made from time to time to divide the genus and there exists an abundance of generic names and types, but the true characters were not recognized, species were erroneously associated, and the universal result was that sooner or later the proposed terms went into the synonymy and but aided to increase the already existent confusion. I have made an effort to use as far as possible existing generic terms in my division of the genus; but I have not had exotic material sufficient to give me an opportunity to study generic types, and the descriptions were in most cases useless, since they did not give the structural characteristics upon which my scheme of division was based. I have therefore felt free to propose new names for the groups into which the species have been formed, quite satisfied to have the names relegated into the patient synonymy when the study of generic types proves their identity with others already proposed.

I had at one time the strong conviction that genera were natural assemblages, capable of strict limitation and definite in extent. The study of very large material since that time has convinced me that my first impression was erroneous, that genera as such are mere artificial divisions of convenience, useful for the purpose of identification and for the expression of relationship, and that they were useful for that purpose just in proportion as they expressed clear and definite associations of characters. *Agrotis* is vague since it is definite on two points merely. *Carneades* is definite, even though species are numerous, for it conveys the association of a large series of characters in addition to that distinctive to it. The limits to which generic division may be carried will depend entirely upon the tact and individual propensities of an author and in large part also upon the tendency of the time at which he is writing. After a period of wild generic creation there comes usually a reaction in which lumping is carried to an extreme, and this is true as to species as well as genera.

For some time Mr. Grote was the only systematic worker in the North American Noctuidæ, and he steadily increased the number of generic divisions until he was in advance of the allowable at that state of our knowledge. The reaction was perhaps typified when, after becoming thoroughly imbued with the critical ideas of my Brooklyn entomological friends and teachers, I published my synopsis of noctuid genera. I there went too far in the opposite extreme, but have no apology to make for it. It acted as a check from which more careful studies have allowed a steady, and I hope healthy and permanent advance.

I have made use of the genital structure of the male for generic division in one case only, where a very large series of species agree most remarkably in structure, and the character becoming generically valuable, lost value in the recognition of species.

The study of the primary sexual characters is one of the most valuable guides in the recognition of species. The structures are within my experience absolutely invariable within specific limits, and species otherwise closely allied are sometimes well separated by these characters. They have proved invaluable in settling questions of the identity of American and European forms so closely allied as to be considered races, and in several instances they have proved the identity or distinctness of species when superficial characters left it in doubt. It has removed individual judgment as a factor in many cases and allows a final appeal in cases of difference. There is no universal test character, however, and as with all others so sexual characters sometimes fail. Over one hundred species referred to *Carneades* have so nearly the same form of structure that there is no sufficient variation to have specific value in doubtful cases. In some other groups, however, no two species are alike, and the widest variance within generic limits allows definite specific limitation.

The work on the *Agrotes* was done in 1884 and 1885. At that time I was employed by Professor Riley as a special agent of the Division of Entomology, and the work was done in the intervals of the economic work assigned to me. Professor Riley sent me as a basis for the work his entire collection, now in the National Museum. My own collection was very fair in the genus, and is now also in the National Museum. The Meske collection, containing many rare species and types, is now also in the Museum collection. Mr. Tepper's collection contained a very great part of Mr. Morrison's types, and these, as well as whatever else I needed for study, were freely placed at my disposal. This collection is now in the Michigan Agricultural College. Mr. Graef's collection contains many of Mr. Grote's and some of Mr. Morrison's types, and these also I had for study. Mr. Hulst as kindly allowed me the use of his material, also containing some of Mr. Grote's types. The grand collection of Mr. Henry Edwards was loaned me for study by its owner, and contained many varieties, typical or authentic, which are not or were not then elsewhere represented. Mr. Neumoegen's collection had been at that time thoroughly revised by Mr. Grote and contained a very large number of the types of Mr. Grote's later descriptions, and to this also I had free access, and Mr. Neumoegen kindly loaned me for study whatever I needed. At Philadelphia the collection of the American Entomological Society was opened to me, and at Cambridge the courtesy of Dr. Hagen enabled me to study the material there. At Salem I studied the material in the Peabody Academy of Science, containing Dr. Packard's types. At Kittery Point I spent a very enjoyable day with Dr. Thaxter, and there I had an opportunity

of identifying a number of species, some of which were loaned me for further study by Dr. Thaxter. Mrs. Fernald's collection at Orono was also studied, and to Professor and Mrs. Fernald I owe thanks for kindly hospitality as well as free opportunity to study the material in the collection. Dr. Lintner also allowed me to use some of his material not otherwise attainable. I had thus an opportunity to study all the types existing in these collections, and my descriptions and studies were largely made from the original types or carefully compared specimens. Dr. Bailey's collection has some uniques, and the doctor, then on what proved his death-bed, courteously loaned me these for study. The material then, upon which the work was originally based was not scant, and I owe to Dr. Riley the opportunity to visit all these collections and to the courtesy of the gentlemen named, as well as to others not named but gratefully remembered, the opportunity to study their material. At that time it was intended to publish a complete monograph of the noctuidæ by Dr. Riley and myself, and the manuscript as prepared by me was sent to Dr. Riley for completion by the addition of the biologic material and the addition of such studies as had been made by him in some of the groups. Circumstances prevented the carrying out of the original plans, and the publication of a complete monographic work was finally abandoned. In 1887 I published in the Proceedings of the U. S. National Museum descriptions of the new species which I had found in my original work. More recently large collections made in California produced numerous new species, necessitating re-arrangement, and to some extent the re-writing of a great portion of the manuscript. Some twenty-three of these species were published in the Transactions of the American Entomological Society for 1890, and scarcely were they in type when another accumulation of material turned up still further species. During the month of January, 1890, I arranged, under Dr. Riley's direction, a large part of the noctuid collection of the National Museum, and on that occasion deposited a number of my types in that collection.

The collection of the Museum in this genus now stands second to none in completeness. By far the greater number of species are represented, many of them by very fine series of bred specimens.

No bibliographical review of the genus will be here attempted, and after this brief history of my work and the material at command, I will proceed at once to outline my scheme of classification.

Primarily the species divide into two series upon the armature of the anterior tibiæ. In the first series the member is not at all spinose, in the second the member is spinose, the armature variable.

Rhynchagrotis is applied to a series of species in which the antennæ of both sexes are simple or merely ciliated in the male. The thorax and abdomen are depressed, the primaries subequal in most cases, the apices rectangular or rounded, the outer margin rounded or scarcely oblique. The palpi tend to form, and in most cases do form, a distinct

snout or beak, which characterizes the forms related to *cupida*, which is the typical species.

I recognize three groups in this genus based upon color, maculation, and tuftings. *Chardinyi* with yellow secondaries is typical of the first; *cupida* with complete ordinary spots, no or but indefinite thoracic tufting, is typical of the second; while the third, with V-shaped, open orbicular and more distinct thoracic tufting, is typical of the third.

Adelphagrotis also has simple male antennæ; the abdomen is not depressed but cylindro-conic, the primaries elongate, trigonate, the thorax with distinct anterior and posterior divided tufts. *Stellaris* may be considered typical of this genus.

Platagrotis is structurally close to the preceding, but the wings are wider, more frail in appearance, the thoracic tuftings indefinite. The species have an entirely different habitus, and *speciosa* may be considered typical.

Eueretagrotis contains a few species differing from all the preceding by wide primaries with strongly arched costa and rounded apices and outer margin. The antennæ are finely serrated in the male, and the thorax is prominently tufted, the crest divided. *Sigmoides* is the typical species.

Abagrotis is based upon a singularly intermediate form, with the wing form of *Rhynchagrotis*, with the serrated and bristly tufted ♂ antennæ peculiar to some of the later genera, and a distinct, keel-like, thoracic crest. The combination is unique, *erratica*, being type and only species.

Semiophora differs from all the preceding in the bipectinated male antennæ. The primaries are wide, the costa arched, somewhat as in *Eueretagrotis*. The genus is not a very compact one, the forms differing in habitus to some extent. *Catherina* is the generic type.

With this ends the series in which the anterior tibiæ are not spinose. It comprises the smaller number of species, and except in *Rhynchagrotis* there is little difficulty in identification.

In the second series two obvious divisions are possible, the first having the front of head smooth and flat; the second with the front rough, protuberant, or tuberculate. The character is easily made out by using a fine pin, which drawn over the front will with a very little care detect the nature of the structure concealed by the vestiture.

Of the first division *Pachnobia* is characterized by loose, hairy vestiture. The species have a bombyciform appearance and are generally reddish or ferruginous in color. In antennal structure they vary from simple to pectinated, further subdivision on this character being here deemed inadvisable. The other genera all have a mixed or scaly vestiture much more compactly disposed.

Setagrotis is characterized by having ♂ antennæ, with the joints laterally furnished with bristly tufts. The primaries are normally trigonate and the habitus refers rather to the later groups than where here interpolated. The generic type is *planifrons*.

To *Agrotis* I refer those species which have armed fore tibiæ, smooth front mixed or scaly vestiture and pectinated male antennæ. The European *segetum* is the generic type. Of our own species, *ypsilon* most nearly resembles the type in habitus.

Peridroma has the male antennæ simple, the fore wings trigonate, regularly widening from base, the apices marked, outer margin oblique. *Saucia* is the generic type.

Two groups are recognized in this genus. The first, of which *saucia* is also type, has the primaries quite strongly produced apically and has a divided thoracic tuft; the second, of which *incivis* is typical, has the primaries less produced apically and has no divided thoracic tuft.

Noctua, of which, among our own species, *normaniana* may be considered typical, differs from *Agrotis* in having the primaries more abruptly widening near base, the apices and outer margin rounded or at most rectangular.

Two groups may also be distinguished in the genus. The first, of which *normaniana* is typical, has the second joint of palpi clavate, and the ordinary transverse maculation is distinct; the second, of which *clandestina* is typical, has the palpi equal throughout, while the transverse maculation is obsolete or confused.

The remaining genera have the front rough, produced, or tuberculate.

Chorizagrotis has the antennæ of the male simple or ciliate merely, the primaries elongate, narrow, subequal and the abdomen depressed. *Auxiliaris* is the generic type.

Rhizagrotis has the primaries normally trigonate in form and the abdomen is not depressed. *Cloanthoides* may be considered the type. The ♂ antennæ are simple.

This genus is divisible into three groups. In the first, the maculation is normal, not strigose, and the ordinary spots are distinct; *abnormis* is typical. In the second, the ordinary spots are more or less obscured by longitudinally strigate marks, transverse lines when evident, single; *acclivis* is typical. In the third, the ordinary spots are more or less completely confluent, the maculation is longitudinally strigose, the transverse lines are wanting, and the colors are pale gray. *Cloanthoides* is typical of this group as well as of the genus.

The remaining genera have the male antennæ serrate and bristled or pectinated, and resort must be had for a main division to the sexual characters which here become very constant in type, varying within narrow limits only. In the one division the clasper attached to the harpes is a single, long, corneous hook or a shorter beak-like process; in the other the clasper is distinctly bifurcate, the forks long and distinct.

Two genera can be recognized in the first division. *Feltia*, of which *subgothica* is typical, has the primaries short and wide, the apices are rounded, and the colors are usually dark. The form is robust and the species are very compactly built. The male antennæ are variable. Two

groups are formed in this genus. In the first, of which *subgothica* is typical the orbicular is open above, V-shaped; in the second, of which *venerabilis* is typical, the orbicular is complete.

Porosagrotis is applied to a series of forms of usually pale colors, moderately long and narrow primaries in which the apices are distinct, and in which the clavifom is rarely, the basal dash never, present. They differ in habitus very greatly from the preceding, and *murænula* is typical.

The remainder of the species, over one-third of the entire number, are referable to the genus *Carneades*, of which *mœrens* and *citricolor* are typical. They agree in the tuberculate front, brush-like (bristled) male antennæ, heavily spinose fore-tibiæ, and finally in the bifurcate clasper of the male genitalia.

This large series of species is divisible into five fairly well-marked groups. Group *wilsonii* has primaries with depressed, somewhat concave costa, the apices somewhat produced, and thus differs from all the others, in which the costa is normally straight or slightly convex. Group *quadridentata* is distinguished by the pale lines marking veins, three and four and six and seven and variably indenting the terminal space.

Group *messoria* is recognizable by the very evident median shade crossing the outer portion of median space, and forming often the only prominent bit of maculation in the species. Group *pitychrous* is largely negative, containing species which have no distinctive characters referring them to other groups. Finally, group *tessellata* contains those species in which the cell is black, or of some darker shade than ground color, between the ordinary spots. A number of species which are not referred to at all in this paper, but which appear in Mr. Grote's list, were not properly referable to *Agrotis*, even under the vague definition which allowed such a loose assemblage.

It is suggestive that so large a proportion of our species are from the western part of our country, and that those species are mostly referable to those genera in which the front is modified in some way and the tibial armature heavy. In fact the distinctive character of the western fauna is shown in the very predominance, and sometimes abnormal development of tibial and clypeal armature. The great preponderance of pale or bright colors of the species of Colorado, New Mexico, Arizona, and Utah is also worthy of note and may allow of some interesting conclusions when the facts are more completely ascertained and collated. I have attempted few generalizations since the bringing of order out of the chaos of species has been a task so great and spread over so long a period that the comprehensive view of the forms as a whole has been obscured. The scheme above outlined is capable of more definite and comprehensive statement in tabular form.

SYNOPSIS OF GENERA AND GROUPS.

1. Anterior tibiæ not spinose 2
   Anterior tibiæ spinose 9
2. Antennæ of male simple or merely ciliated 3
   Antennæ of male serrated and bristled 7
   Antennæ of male pectinated 8
3. Abdomen and thorax depressed; primaries subequal; outer margin and apex rounded or rectangular ..... RHYNCHAGROTIS, 4
   Abdomen normally cylindric or conic; wings trigonate 6
4. Secondaries yellow ..... Group *chardinyi*.
   Secondaries fuscous or smoky, not yellow 5
5. Thorax not, or obsoletely, tufted; ordinary spots complete ..... Group *cupida*.
   Thorax more or less evidently tufted; orbicular incomplete, open superiorly, Group *exertistigma*.
6. Primaries elongate, thorax with distinct anterior and posterior divided tufts, ADELPHAGROTIS.
   Primaries wide and frail; thoracic tuftings indefinite; costa not arched, PLATAGROTIS.
   Primaries unusually wide, costa strongly arched; thoracic tuftings distinct, EUERETAGROTIS.
7. Thorax with a sharp crest; wings as in group *cupida* ..... ABAGROTIS.
8. Wings broad; costa of primaries arched ..... SEMIOPHORA.
9. Front smooth 10
   Front rough, tuberculated, or pitted 15
10. Vestiture long, loose, and hairy; antennæ various ..... PACHNOBIA.
    Vestiture mixed scales and hair 11
11. Antennæ of male with joints marked laterally with tufts of bristly hair, SETAGROTIS.
    Antennæ of male bipectinated ..... AGROTIS.
    Antennæ of male simple or merely ciliated 12
12. Primaries regularly widening, apices distinct, not rounded ..... PERIDROMA, 13
    Primaries with apices rectangular or rounded ..... NOCTUA, 14
13. Thorax with distinct anterior and posterior divided crest; primaries quite strongly produced at apex ..... Group *saucia*.
    Thoracic tufts not divided; apices of primaries less produced ..... Group *incivis*.
14. Palpi clavate toward tip; transverse lines and ordinary spots distinct, Group *normaniana*.
    Palpi equal throughout; transverse lines and ordinary spots becoming obsolete or confused ..... Group *clandestina*.
15. Antennæ of male simple or ciliate only 16
    Antennæ of male pectinated or serrate and bristled 18
16. Primaries narrow, elongate, subequal, ordinary spots always, lines usually, distinct; abdomen depressed ..... CHORIZAGROTIS.
    Primaries normally wide, abdomen not depressed ..... RHIZAGROTIS, 17
17. Maculation normal, not strigose; ordinary spots distinct ..... Group *abnormis*.
    Ordinary spots more or less obscured by longitudinally strigate marks; transverse lines when evident, single ..... Group *accliris*.
    Ordinary spots more or less completely confluent, maculation longitudinally strigose; transverse lines wanting; colors pale ..... Group *cloanthoides*.
18. Clasper of male genitalia consisting of a long, corneous hook, or shorter, beak-like process 19
    Clasper of male genitalia bifurcate ..... CARNEADES, 20
19. Wings short and wide, apices not pointed; colors dark ..... FELTIA.
    Orbicular open above, costa paler ..... Group *subgothica*.

Orbicular complete; claviform always, basal dash usually, distinct, Group *venerabilis*.

Wings longer and narrower; apices marked; claviform seldom, basal dash never, present, colors pale ..... POROSAGROTIS.

20. Costa concave, depressed, apices of primaries produced ..... Group *wilsonii*.
Costa normal, straight or convex 21

21. Maculation indefinite, not belonging to other groups ..... Group *pitychrous*.
S. t. space crossed by pale sagittate lines on veins three and four and six and seven, variably indenting s. t. line ..... Group *quadridentata*.
No sagittate marks.
A distinct transverse median shade through outer part of median space, Group *messoria*.
No transverse median shade; cell between the ordinary spots dusky to blackish, Group *tessellata*.

Genus RHYNCHAGROTIS Smith.

Anterior tibiæ not spinose; antennæ of male simple; abdomen depressed; thorax more or less depressed, obsoletely tufted, or with small divided crests. Primaries subequal, outer margin rounded; apex rounded or rectangular, palpi forming a more or less evident snout.

The above will suffice to distinguish the particular series of the *Agrotes* to which it refers, in addition to what has already been said on the subject.

Three groups are united under this term, differing among themselves in pattern of maculation and in the type of the male genitalia.

Group *chardinyi* is easily distinguished by the yellow secondaries.

Group *cupida* contains species in which the maculation is complete and the thorax is not, or not prominently, tufted. The palpi are most evidently snout-like.

Group *exsertistigma* contains species in which the orbicular is more or less V-shaped, open to the costa which is usually more or less pallid. The thoracic tufts are always evident, but scarcely prominent.

The characters of the genitalia are discussed under the group headings.

Group CHARDINYI.

Anterior tibiæ not spinose, front smooth, antennæ of male simple, flattened, densely clothed with fine pubescence beneath, and with long ciliæ from each side of each joint, not pectinated as stated by Mr. Grote. The thoracic vestiture is smooth, hairy, the hairs slightly flattened. Abdomen depressed. Primaries rather short, broad, apices rectangular, outer margin straight, to the middle. Secondaries yellow with a broad black margin and yellow fringes.

This group, though placed with, and certainly very closely allied to *cupida*, yet shows so many peculiar characteristics that it would seem possible to separate it by a distinct generic term. The two species, *rufipectus* and *brunneicollis* are, however, somewhat intermediate, and as the species can hardly be referred to *Triphæna*, I prefer to leave it

here. The yellow secondaries will at once distinguish it, as no other American species is so marked.

The form found here, is said to be the Asiatic *chardinyi*. Mr. Grote first stated that the fore tibiæ in his specimens were spinose, but I have never been able to discover any.

The bibliography so far as refers to our fauna, is—

Rhynchagrotis chardinyi Bdv.

1829. Bdv., Ind. Meth., 94, *Triphæna*.
1856. Gn., Sp. Gen. Noct., I, 317, *Triphæna*.
1874. Strk., Lep. Rhop. et Het., 79, *Agrotis*.
1883. Grt., Proc. Am. Phil. Soc., XXI, 156, *Agrotis*.
gilvipennis Grt.
1874. Grt., Sixth Rept. Peab. Ac. Sci., App., 24, *Agrotis*.
1874. Grt., Can. Ent., VI, 71, *Agrotis*.
1875. Grt., Bull. Buff. Soc. Nat. Sci., II, 301, *Agrotis*.
1875. Morr., Proc. Bost. Soc. N. H., 18, p. 117, pr. syn.
1876. Grt., Stett. Ent. Zeit., V, 37, 135, pr. syn.

Primaries varying in tint from reddish to dusky ocher brown with the transverse lines blackish, even, tolerably distinct; the t. p. line with a rounded outward extension opposite the cell and a slight outward tooth on vein one. Ordinary spots sometimes distinctly limited. Orbicular very oblique, attaining or fusing with the reniform inferiorly, pale with indistinct darker interior shades. Reniform upright, moderate, with darker center and pale ochery ringed. The median space is shaded with blackish posteriorly. S. t. line distinct and continued, preceded by a dark costal shade relieving two costal pale dots. Terminal line even, fringes dark. Hind wings yellow, with yellow fringes, and a very broad black margin which intrudes more or less on the central yellow field. Beneath the hind wings are yellow with narrower black hind border and faint discal point; costal region dusky. Fore wings with the center blackish, costal and terminal regions brownish, varying in tone with the upper surface. The body colors vary in tone with the fore wings, and the black margins of the hind wings vary in width, sometimes encroaching strongly on the yellow discal field.

Expanse 26–34^{mm}. 1.05–1.35 inches.

HABITAT.—Anticosti, Labrador, Maine, New York (Adirondacks), Canada, Vermont.

The above description is principally from Mr. Grote's characterization of *gilvipennis*, which is very fair. There is considerable variation in the ground color, and in the relative distinctness of the markings, and also in the distinctness and size of the white costal spots. The genitalia of the male are very simple, the harpes with the tip rounded, not spinulose. The clasper consists of a long, very strongly curved, corneous hook, shown in figure 1 on Pl. II.

I have taken this species in the Adirondacks at an elevation of about 2,000 feet, and also in Bennington County, Vermont. It seems not rare

from Maine northward, and is attracted by light. I have not been able to compare Siberian specimens, and as Mr. Grote has accepted the relegation of his species into the synonymy, I follow Mr. Morrison's reference.

Group CUPIDA.

The species which I bring together in this group, form an aggregation rather sharply defined from the other species of the genus and entitled perhaps to distinct generic designation. They really represent in our fauna the yellow winged species of Europe for which *Triphæna* has been used, and of which *pronuba* may be considered typical. The head is small, front smooth, narrow, gently rounded, not bulging; the eyes moderate, the palpi short, projected straight forward, second joint enlarged at tip, less so in the first subgroup, terminal joint minute. The front has a small pointed tuft which with the straight palpi form a short compressed snout, less evident in *rufipectus* and *brunneicollis* and again perceptible in some species of the *exsertistigma* group, but yet so evidently marked in the second subgroup that by this character alone could the species be recognized. Other characters are, however, not wanting. The thorax is depressed, smoothly clothed except in the aberrant *mirabilis*, the vestiture being scaly, with an admixture of flattened hair. Abdomen flattened, truncate at tip, the appearance most evident in virgin ♀ ♀ or in those which have oviposited. The gravid ♀ has the abdomen distended, cylindric, with an obtuse conic tip, and yet even then the depressed appearance remains, and is very distinct from the normal type. The primaries are comparatively narrow, subequal in most species, or when they are trigonate, then the wing is rather short, and never ample. In the typical species the ornamentation is nearly identical, differing only in minor details. The ordinary spots are always present and always complete, though occasionally they are very faintly traceable. In nearly all the species the terminal space is more or less discolorous, or at least slightly paler than the ground color, though this is variable in specimens of the same species. As a whole, the species of the group are recognizable at a glance.

Two evident subgroups may be recognized, the first containing *rufipectus* Morr., and *brunneicollis* Grt., and the other, the balance of the species. In ornamentation the species agree in having the head and collar darker than ground color, which is the case in no member of the next subgroup. The palpi are not so evidently formed into a snout, and the abdomen is longer. Among themselves the species differ in the darker color, and purplish red body vestiture of *rufipectus*, and in the narrow primaries and ample secondaries as well as pale color of *brunneicollis*. Another common character which separates them from the other species is the form of the ♂ genitalia, which are somewhat allied to *chardinyi*. Here the harpes are membraneous, broad, only slightly concave, the tip slightly produced superiorly and rounded.

The clasper is long, corneous, and curved, single. In the remainder of the species, *cupida* and *alternata* excepted, one general form of clasper obtains. Clasper and harpes are practically combined in an excavate corneous main shank, with a long curved superior process. In *cupida* the same general form obtains, but from the upper inner margin projects a short finger-like process.

Alternata differs in having from the middle of the main shank a conical chitinous process prolonged into a short acute and slightly curved hook.

The species are otherwise readily separated. *Mirabilis* and *inelegans* are aberrant in having a more or less evidently discolorous thoracic disc and fore and aft tufts, which at once distinguish these species; *inelegans* has the reniform concolorous; in *mirabilis* it is pale, discolorous. *Vittifrons* and *bimarginalis* agree in the general dark color, and the broadly pallid contrasting costa, differing among themselves by the otherwise even color of *vittifrons*, and the contrasting ferruginous thorax and gray terminal space of *bimarginalis*. Together they are most nearly allied to *mirabilis*, and through it to *stellaris*, in one direction, and *exsertistigma* in the other. The remaining species are exceedingly variable in ground color, which ranges from clay yellow or drab to olivaceous gray or deep red brown, and in the details of maculation. Yet with a little care the species are easily recognized. *Minimalis* and *cupida* have elongate, narrow primaries; in the first the lines are simple, in the second they are geminate, and at the inner margin of s. t. line is a dark costal patch, which through all color variations holds its own and marks this species to a certainty. It is a purely eastern and rather northern form.

In *placida* the wings are proportionately shorter, the apex and outer margin are strongly rounded, and the species as a whole looks stouter than *cupida*. The terminal space is usually distinctly blue gray, but occasionally in a pale drab specimen, the contrast is hardly apparent. The species is usually western.

Variata, *alternata*, and *cupidissima* are wider-winged species. *Alternata* is easily recognized. It is larger than the others and the color is nearly always pale drab or clay yellow; the terminal space is always paler, and the maculation is very distinct. It is an eastern form.

Variata is also a large species with the maculation subobsolete, the lines powdery, and the terminal space pale bluish-gray; *varix* Grt. is applied to a pale form of this species. It is western.

Cupidissima is a smaller insect with usually more evident maculation and less contrasting terminal space; *orbis* and *laetula* are applied to forms of this species. It is western.

It is noticeable that while the eastern species of the second subgroup differ from the western forms, and *inter se*, in the form of the ♂ genitalia, the western forms show a remarkable agreement in this respect. Mr. Butler has made some synonymical references in this group which

I find it impossible to accept. He makes *varix*, *variata*, and *alternata* forms of *phyllophora*, although the latter is structurally distinct from the others and referable to a different genus. Mr. Butler's paper in Trans. Ent. Soc., Lond., 1889, Pt. III, proves that he has completely missed the true basis of generic distinction in this group, and his associations of species are thoroughly superficial and structurally unwarranted.

SYNOPSIS OF THE SPECIES.

Thorax untufted or with but a feeble basal tuft.
  Head and collar discolorous, brown or black.
    Thorax and primaries deep carneous gray, collar black ..... RUFIPECTUS.
    Thorax and primaries yellowish, head ferruginous ..... BRUNNEICOLLIS.
  Head and collar concolorous, costa not discolorous, paler.
    Primaries narrow, subequal.
      Primaries elongate.
        Color reddish brown, transverse lines single ..... MINIMALIS.
        Color from clay yellow to red brown; transverse lines geminate; a dark costal patch at inception of s. t. line ..... CUPIDA.
      Primaries shorter, color varying from dirty yellow to bright red brown or dark gray; terminal space usually pale gray or bluish, rarely concolorous, PLACIDA.
    Primaries evidently wider, trigonate.
      Color dark brownish red to pale drab or olive gray, terminal space contrasting bluish gray, transverse lines indistinct powdered with gray, ordinary spots faintly outlined ..... VARIATA.
      Color clay yellow with paler contrasting terminal space, transverse lines and spots very distinct; s. t. line sinuate, uneven ..... ALTERNATA.
      Color varies from clay yellow to bright red, terminal space not contrasting, transverse lines faint; s. t. line more even ..... CUPIDISSIMA.
  Collar discolorous, primaries with costa broadly pallid.
    Thorax ferruginous, outer margin of primaries bluish gray ... BIMARGINALIS.
    Thorax sepia-brown, primaries evenly concolorous ..... VITTIFRONS.
Thorax with distinct anterior and posterior tufts.
  Reniform concolorous, outlined with pale scales ..... INELEGANS.
  Reniform large contrasting pale yellowish ..... MIRABILIS.

Rhynchagrotis rufipectus Morr.

1874 Morr., Proc. Bost. Soc., N. H., 17, 165, *Agrotis*.
1876 Grt., Ann. Lyc. Nat. Hist. N. Y., XI, 304, *Agrotis*.

Thorax and primaries of varying shades of bluish gray, somewhat irrorate with brown scales, collar and head dark red brown, the former tipped with gray; transverse lines geminate narrow, black, often obsolete; t. a. line forming three distinct outward curves or scallops; t. p. line slightly crenulated, with a regular outward curve over the cell; s. t. space darkening gradually to the distinct black s. t. line. Ordinary spots faintly outlined by brown scales, reniform with a dark filling; at lower portion a faint brown median shade is traceable. Beneath, the ornamentation is that common to the entire group; primaries with costal and outer margin irrorate with purplish scales, else blackish;

secondaries with anterior margin irrorate with purplish scales, else gray; a common dark extradiscal line crosses both wings and the secondaries have a distinct discal lunule. The vestiture of body beneath is long, thin, purplish red.

Expands 33–37^{mm}; 1.30–1.45 inches.

HABITAT.—Northern and Eastern States, Lewis County, New York, July 29, British Columbia, Oregon.

Evidently referable here by the general habitus, yet sufficiently distinct from all except the following species to form the type of a subgroup which shall be distinguished by the shorter palpi not forming a distinct beak, by the somewhat more ample secondaries, the longer abdomen, and the form of the ♂ genitalia. Some of the western specimens are extremely difficult to separate from *brunneicollis*, different as the type forms of the species are.

Rhynchagrotis brunneicollis Grt.

1864. Grt., Proc. Ent. Soc. Phil., III, 524, pl. 5, f. 5, *Noctua*.
1869. Grt., Trans. Am. Ent. Soc., II, 309, *Agrotis*.

Primaries reddish gray, slighly irrorate with black, and more extensively with ferruginous scales; transverse lines dark-brown, distinct, but interrupted; basal line distinct, blackish, straight; t. a. line blackish, geminate, nearly straight, forming three even curves; t. p. line often indistinct, crenulate, forming black dots on the veins, as a whole the line with a rather even outward curve; s. t. line narrow, pale, indistinct, sinuous, a distinct dark costal shade at its inception often continuing as a narrow margin to the pale line; ordinary spots large, distinct, concolorous with the rest of the wing, well defined by ferruginous or darker annuli; the reniform broad, but slightly excavated externally; terminal space often somewhat darker; a faint narrow ferruginous median shade; fringes long, darker than the rest of the wing; secondaries broad, very pale grayish testaceous, immaculate, very slightly darker shaded along external margin; beneath, primaries reddish along the costa, rest of the wing blackish gray, paler along terminal margin; secondaries as above, except along costa, which is powdered with reddish gray scales; a common dark exterior line; head ferruginous brown, collar deeper dark brown; thorax else concolorous with the primaries.

Expands 35–40^{mm}; 1.40–1.60 inches.

HABITAT.—New York, Massachusetts, Maine, Canada, Northern, Eastern, and Middle States. Albany in June.

As compared with *rufipectus* this species has narrower, longer primaries, more ample secondaries, and longer abdomen. The differences in color are ordinarialy so great that there is no difficulty in separating them. In some western specimens however I have been seriously puzzled to say which species was before me. The genital structure is prac-

tically identical, while the style of maculation is also the same. The difference in size and in ground color remains as the most prominent distinctive feature, and these are not always constant. I have referred these western specimens to *rufipectus*.

The species is not common.

Rhynchagrotis minimalis Grote.

1879. Grt., No. Am., Ent. i. 45, *Agrotis*.

Head, thorax, and primaries brick red, with a faint yellowish tinge, terminal space somewhat paler; secondaries and body smoky gray, fuscous. Palpi laterally dark. Primaries with transverse lines single, dark, followed by a narrow pale shade. T. a. line even, or but slightly wavy, outwardly oblique from costa. T. p. line crenulate, outwardly curved over the cell. S. t. space slightly darker, the course of the s. t. line being marked by the contrast to the paler terminal space. A terminal row of dots, fringes concolorous, orbicular small, round, pale, with darker center. Reniform small, dark, a diffuse and somewhat obscure median shade, evident below reniform.

Expands 32–38 mm; 1.32 inches.

HABITAT.—Colorado, Maine.

This species, of which I have had no male for dissection, is ordinarily very easily recognized. There are however, among specimens, sent me by Mrs. Fernald, some forms, which while probably rightly referred here, show a much nearer approach to *cupida* than a knowledge of Colorado specimens alone would seem to indicate. The species seems not common.

Rhynchagrotis cupida Grt.

1864. Grt., Proc. Ent. Soc. Phil., III, 525, pl. 5 f. 7, *Noctua*.
1869. Grt., Trans. Am. Ent. Soc., II, 309, *Agrotis*.
1874. Grt., Can. Ent., VI, 16, *Cerastis*.
1878. Grt., Can. Ent., X, 234, *Agrotis*.
1878. Lintner, Ent. Cont., IV, 124, *Agrotis*.
1889. Butler, Trans. Ent. Soc., Lond., 1889, 383, *Amathes*.
velata Wlk.
1865. Wlk., C. B. Mus., Lep. Het Suppl., 3, 710, *Graphiphora*.
1889. Butler, Trans. Ent. Soc., Lond., 1889, 383, pr. syn.
Var. BRUNNEIPENNIS Grt.
1875. Grt., Can., Ent. VII, 187, *Agrotis*.
1878. Grt., Can. Ent. X, 234, an var. pr. ?
1883. Grt., Proc., Am. Phil. Soc., XXI, 155, *Agrotis*.

Varies in color of thorax and primaries from drab or clay yellow to dark red brown, more or less powdery. The more usual form is a brick or dull red, abdomen somewhat more grayish; secondaries fuscous to blackish, sides of palpi also black. The maculation is often more or less indistinct, but when fully present is as follows: All the lines gem-

inate. Basal line, black, curved t. a. line outwardly oblique, blackish, waved, included space paler; a distinct black spot on costa at inception of the outer part of the line; t. p. line even, dark brown, included space paler, a distinct black patch on costa at inception of inner line, outer line punctiform; the line makes a slight outward curve over discal cell. S. t. line initiated by a large, distinct black costal patch, then sinuate, rather as a darker shade emphasized by black venular points, followed by a narrow pale shade to hind margin. S. t. space sometimes as a whole darker than the rest of the wing. Ordinary spots distinct, annulate with a paler shade, orbicular very slightly oblique sometimes concolorous, more usually darker; reniform moderate, with an evenly blackish center, of the normal shape. Beneath, primaries reddish along the costa, otherwise blackish gray, with a more or less evident outer line; secondaries paler than above, powdered with reddish along costa, irrorate with black scales; a faint outer line and evident discal spot.

Expands 31–37^{mm}; 1.25–1.50 inches.

HABITAT.—Canada to Virginia, west to Pennsylvania; Texas.

From this typical form the variations will run to an almost complete obsolescence of maculation, and again to a darker form, the maculation black and strongly relieved. A permanent feature, which seems the specific character, is the costal spot preceding the s. t. line, and which seems to survive all sorts of modifications. The genital structure of the male is peculiar, as I have already stated, and as shown at Pl. II, f. 3. Mr. Grote has had some of the variations of this species, and he says (Can. Ent. X, 234): "What may be taken as the typical form, or that which is best marked, expands 33–35^{mm}. The wings are of a brick brown, with the stigmata filled with black; a black mark on costa at inception of s. t. line; the s. t. space a little darker than the rest of the wing; the lines well defined. A larger form from Texas expands 40^{mm}. It has been reared from the larva by Belfrage (No. 674). It is more red, more unicolorous, the markings less obtrusive. A specimen taken by Dr. Bailey is the size of the typical form, but has the subbasal and subterminal spaces entirely filled in with black. Then come three specimens in which the fore wings seem a little narrower, and the expanse smaller. One is bright orange red, all the markings obsolete. Another is more of the typical shade, but both the spots are ringed with bright yellow. The third I have decided as distinct under the name of *brunneipennis*."

Mr. Grote did not have all the variations, apparently, and was in error in considering the Texan specimens as referable here. It constitutes a very distinct species, nearer to *alternata*, and as such I have separated it in the collection of the U. S. National Museum, which contains several of the Belfrage specimens. It may be called *belfragei*, and the above comparative features will easily separate it. I believe it the only one of this group in Texas.

The type of *brunneipennis* is an extreme form, and Mr. Grote's description may therefore be reproduced:

"Allied to *cupida* but smaller; fore-tibiæ unarmed; thorax and forewings of a glossy chestnut brown, somewhat reddish; none of the usual markings are noticeable. The sub-terminal space is stained with blackish. Following the s. t. line is a series of faint, pale, interspaceal fleckings; ordinary lines indicated on costal region. Hind wings blackish fuscous; abdomen beneath stained with reddish brown, as is the costal region of primaries, else the blackish wings beneath show only a common black transverse line, which fades out toward the internal margins."

Lintner, in the Ent. Cont., IV, 124, rather doubts the identity of the forms referred by Mr. Grote to this species, and describes the larval habits of the species without describing the larva itself. According to him it is sometimes quite injurious to grape, feeding on the buds.

The species is the most common eastern representative of its group.

Mr. Butler's reference of *Graphiphora velata* Wlk. as a synonym of this species, is accepted as an easy way of getting rid of Walker's name, and because the reference is probably correct.

Rhynchagrotis placida Grt.

1876. Grt., Ann. Lyc. Nat. Hist. N. Y., XI, 305, *Agrotis*.
1878. Grt., Can. Ent. X, 235, *Agrotis*.
1889. Butl., Trans. Ent. Soc., Lond., 1889, 383 = *cupida*.

"Fuscous gray. Fore wings smooth, dark fuscous. Basal and subterminal spaces blackish and darkest; median space a little lighter, slightly brownish; terminal space gray, contrasting. Lines even, perpendicular, pale. Transverse anterior line with a slight subcostal notch, slightly oblique; median space wide; stigmata difficult to make out, pale ringed, concolorous; median shade noticeable, obscuring the reniform. Transverse posterior line with a straight, outward costal extension beyond the point of origination, thence somewhat squarely exserted opposite the cell, and running nearly straight downwards without submedian sinus. Subterminal line indicated by the great difference in color between the two terminal spaces; fringes dark. Hind wings concolorous, rather dark fuscous, with paler, interlined fringes. Beneath, fuscous, with a slight purply shade, irrorate, with an external common band incomplete; a slight discal mark on hind wings. Terminal abdominal hairs somewhat ocherous."

The above description is from Mr. Grote, to show the type form of the species. It was from a specimen taken by Mr. Hill in Lewis County, New York, July 26.

In Can. Ent., X, 235, Mr. Grote, commenting on four specimens from Nevada, says: "One has the fore wings shaded with brown, median and terminal space both paler, markings quite distinct. Another is almost unicolorous blackish, with the shadings and markings powdery.

Again another has a reddish cast, reminding one of *cupida*, but with pale terminal space."

In my own experience the ground color varies from dark clay yellow to a purplish gray in one direction, and deep red brown, sprinkled with bluish gray, in another. The arrangement of the lines and spots is essentially as in *cupida*, but the maculation is not so evident, there is no black costal patch initiating the s. t. line, which is also more even and the terminal space is always paler, often contrasting bluish gray to a dark red ground color. The palpi are somewhat shorter, the primaries proportionately a little shorter and wider, while the size is generally decidedly smaller. The genitalia are also different from those of *cupida* as shown on Pl. II, f. 4.

Expands 25–35^{mm}; 1–1.40 inches.

HABITAT.—New York, Nevada, Colorado, Utah, Arizona.

Nothing has been written of the larva so far as I know.. The species is much more common in the Western States, and is rather more nearly allied to forms at home there than to *cupida* or *alternata*.

Mr. Butler would see in this species a ♀ form of *cupida* merely.

Rhynchagrotis variata Grote.

1876. Grt., Bull. Buff. Soc. N. Sci., III, 83, pl. 4, f. 12, *Agrotis*.
1883. Grt., Pr. Am. Phil. Soc., XXI, 155, *Agrotis*.
1889. Butl., Trans. Ent. Soc. Lond., 1889, 382 = *phyllophora*.
varix Grt.
1876. Grt., Bull. Buff. Soc. N. Sci., III, 83, *Agrotis*.
1882. Grt., New List, an var., pr. ?
1889. Butl., Trans. Ent. Soc. London, 1889, 382 = *phyllophora*.

"Terminal space pale; this species differs by the more irregular, pale, powdery s. t. line, relieved from the pale terminal shading by the ground color of the wing obtaining beyond it. The dark fore wings are stained with ocherous. The geminate lines with pale included shades are well defined and inaugurated with black costal dots. Stigmata concolorous, ill defined; orbicular round, moderately large; reniform upright, narrow; both defined by narrow, pale yellowish annuli, a diffuse pale powdering over the place of the claviform. Collar, head and palpal tips grayish; palpi black at the sides; thorax like fore wings. Hind wings dark fuscous with interlined fringes, beneath with common line *straightly* marked with black on costa of primaries."

The above is Mr. Grote's original characterization. In my experience it varies from pale to deep red brown, occasionally more yellowish. The median lines usually consist only of the included pale shade and are often very diffuse, powdery. The form named *varix* by Mr. Grote he characterized as follows:

"Like the preceding with pale terminal space. Of a pale drab or gray olive fuscous. Markings much like the preceding [*variata*], from which it seems to differ in color, in the greater width of the geminate

lines, and particularly in that beneath, the common line is outwardly *obliquely* marked with the black on the costa of primaries. Generally paler and less distinctly marked than *variata*."

None of the characters are at all constant, and there is no point at which even the varietal line can be satisfactorily drawn.

Expand 33–40^{mm}; 1.32–1.60 inches.

HABITAT.—Colorado, Nevada, California, Arizona, Vancouver.

As already indicated the genital structure of this species agrees with that of *placida*, and to that species the present is more nearly allied. It is, however, larger, and wider winged, and the powdery transverse markings are somewhat distinctive in course as well as appearance. In a Californian specimen examined, the s. t. line was distinct, pale, sinuous, and only the outer portion of the terminal space was pale.

Rhynchagrotis alternata Grt.

1864. Grt., Proc. Ent. Soc., Phil., III, 526, pl. 5, f. 8, *Noctua*.
1874. Grt., Can. Ent., VI, 15, *Cerastis*.
1874. Grt., Can. Ent., VI, 214 *Agrotis*.
1878. Grt., Can. Ent., X, 235, *Agrotis*.
1889. Butl., Trans. Ent. Soc., Lond., 1889, 382=*phyllophora*.

Pale to dark clay yellow; primaries irrorate with black; all the markings distinct; s. t. space darker, terminal space paler than ground color. Maculation essentially as in *cupida*. Basal line geminate, brownish. T. a. line oblique, geminate, with a simple subcostal dentation, thence undulate to internal margin. T. p. line geminate interrupted, nearly straight, but little arcuated at the disc; beyond, and close to the line is a row of dark venular dots, giving the appearance of a third line. S. t. line marked by the contrast between the dark s. t. and paler terminal space, the s. t. shading in pale specimens looking very much like a dark fascia. A series of blackish terminal dots. Ordinary spots narrowly annulate with pale, darker than ground color, the reniform slightly shaded with ferruginous. Secondaries fuscous to blackish, fringes contrasting, pale reddish yellow. Beneath the margins of both wings are reddish yellow, the disc of primaries blackish, of secondaries paler, luteous. A common, blackish extra-discal line. Palpi pale ferruginous, not black at sides, and thus this species is easily separable from all the preceding forms.

Expands 35–38^{mm}; 1.40–1.50 inches.

HABITAT.—Middle and Northern Atlantic States, District of Columbia.

This is one of the most constant species of this group, both in size and maculation. I have seen many pale specimens of *cupida* labeled *alternata*, and Mr. Grote himself is not guiltless of such errors. I have never seen the species from the Pacific States, though Mr. Grote gives this as a Californian species in Can. Ent., VI, 215, but I believe he had a well marked specimen of *cupidissima* before him rather than *alternata*,

and the same is probably true of the Nevada specimen referred to in Can. Ent., x, 235. In fact, the whole paragraph in reference to this Nevada specimen points to *cupidissima* almost without doubt. The sexual characters of the male point to *cupida* rather than the other species, and the color of the palpi seems to form a safe character for superficial classification or determination. I have never seen this species shading into red, all the red specimens proving *cupida*.

Rhynchagrotis cupidissima Grt.

1875. Grt., Can. Ent., VII, 101, *Agrotis*.
1878. Grt., Can. Ent., X, 234, *Agrotis*.
1878. Grt., Bull. Surv., IV, 173, *Agrotis*.
1883. Grt., Proc. Am. Phil. Soc., XXI., 155, *Agrotis*.
orbis Grt.
1876. Grt., Bull. Buff. Soc. N. Sci., III, 83, *Agrotis*.
1878. Grt., Bull. Surv., 174, *Agrotis*.
1883. Proc. Am. Phil. Soc., XXI, 155, an syn. pr.?
lætula Grt.
1876. Grt., Bull. Buff. Soc. N. Sci., III, 83, *Agrotis*.
1878. Grt., Can. Ent., X, 234. pr. syn.
1878. Grt., Bull. Surv. IV, 173, an sp. dist.

"The Californian specimens are light red colored, with powdery geminate lines, and variable in appearance; one is pale fawn, unicolorous, without marks on primaries save indications of the stigmata and the dotted t. p. line. Again, three specimens have the orbicular somewhat V-shaped, open above. The t. p. line is more regular than in *cupida;* it is accompanied by black dots. The subterminal line is nearer to the margin than in either *alternata* or *cupida*, but it is more like *alternata* than it is *cupida* in its being irregular, accompanied with powdery black scales; it is preceded on costa by a blackish shade, as in *cupida*. The present species I formerly considered as *alternata* from the markings, and on Mr. Morrison's authority as *cupida* from the color, but the reniform I now see is more kidney-shaped than in either the eastern *alternata* or *cupida*. I sent a specimen to Mr. Morrison to show the variability of what I supposed was his *exsertistigma*, and he informed me that the specimen was *cupida*. *Afterward* he returned me my specimen of *exsertistigma*, * * * which I then saw was an entirely different species. I have subsequently adopted the view that the Californian specimens were *cupida*, and that I was in error in considering them to be *alternata*. I now reject both determinations, and consider that the Californian species is allied to both *alternata* and *cupida*, and is a new species from the data given above. The habitus of *cupidissima* and size (39^{mm}) is rather that of *alternata*. The hind wings are a little paler at base in *cupidissima*, and the lunule more obvious. *A. cupida* does not as yet appear to occur in California."

The above is Mr. Grote's original description; afterward, in Can. Ent., x, 235, he refers to the species as of a "pale reddish clay color," and in the Bull. Surv., iv, 173, says: "Nearest to *cupida;* similarly sized, but paler, with the orbicular incomplete superiorly. Varies by the primaries becoming clay colored without markings. Collar unlined."

Mr. Grote has confounded two distinct species in his characterizations—one with open orbicular, and one with the orbicular closed. A long series of specimens in Mr. Neumoegen's collection are all of one species and are regarded as typical, the more as Mr. Grote's references of *orbis* and *lætula* to this species is most consistent with this type.

The species is common in the Western States, and I have seen long suites, in none of which the orbicular showed any tendency to become incomplete. They vary in color from very pale luteous to a very distinct red brown, the terminal space usually a little paler, but the color very even as a whole. Sides of palpi black. Transverse lines and ordinary spots much as in *alternata*, but generally indistinct and difficult to make out. Ordinary spots usually slightly and often considerably darker and narrowly annulate with a paler shade. Secondaries and under side as in *alternata*. In size it ranges *below* the expanse given by Mr. Grote (39^{mm}), my largest specimen being 35^{mm}, ranging down to 30^{mm} (1.20–1.40 inches). The wing form is generally more trigonate than in the other species, the primaries short and broad. The genital structure is like *placida*.

Orbis was described by Mr. Grote as follows:

"Entirely concolorous drab or pale olive fuscous, shining; s. t. space barely differentiated by its darker tint. All the lines faint, geminate, as in allied species. Distinguished by its reduced, round, complete orbicular, and small, upright reniform spots, annulated with pale; the orbicular distinctly margined. Head and thorax concolorous. Hind wings concolorous fuscous with interlined fringes; beneath with discontinued common line."

In Bull. Surv., iv, 174, Mr. Grote says: "Closely allied to *alternata*. Stigmata complete; orbicular very small, pale-ringed, spherical. Unicolorous olivaceous gray, shining; terminal space hardly paler. Possibly a variety of *alternata* but the spots are concolorous."

In the Proc. Am. Phil. Soc., xxi, 155, the suggestion that this may be a form of *cupidissima* is made, and I believe this is correct. At all events it is easy in any series of *cupidissima* to pick out *orbis* or what fully answers to the description.

Lætula is said to be "Allied to *cupidissima*. This species is smaller, and has a line on the collar, and the thorax and fore wings of a burnt brown, strewn with ocher scales, which fill the stigmata in one specimen, and in the other leave the spots concolorous, while encircling them and filling the geminate lines. Except in color, this form differs very little from *cupidissima*, while seeming narrower and shorter winged.

All the stigmata shown. Hind wings and under surface as in *cupidissima*, which is a light red species."

In Can. Ent., x, 234, the reference to *cupidissima* is more positively made, but in Bull. Surv. IV, 173, the following are indicated as distinctive:

"Darker than the preceding [*cupidissima*], purple brown, with powdery ochrey markings; claviform indicated, collar unlined, a little smaller than *cupidissima*."

The only specimen of *lætula* which I have seen labeled by Mr. Grote did not agree with this description at all and was the same as the *observabilis* of Mr. Graef's collection, belonging to the *exsertistigma* group rather than here. Mr. Grote speaks of all these forms from California only. I have them from California, Colorado, Arizona, Kansas, and British Columbia.

Rhynchagrotis bimarginalis Grt.

1883. Grt., Ann. & Mag., N. H. (Lond.), 1883, 53, *Agrotis*.
1883. Trans. Kans. Ac. Sci., VIII (1881–'82), 54, *Agrotis*.

Head, thorax, and anal tuftings orange brown to ferruginous; collar grayish; primaries deep brown, with blackish shading; costa contrasting, leather brown or reddish yellow; s. t. space black on costa, else powdered with ferruginous; terminal space gray; basal space and space between the sinuate t. a. lines powdered with ferruginous; t. p. line even, slightly crenulate; a row of venular dots through the s. t. space; ordinary spots obscured by the blackish shading; secondaries blackish gray, as is also the abdomen, save anal tuftings; beneath dusky, with common outer shade line and discal spots.

Expands 35–36^{mm}; 1.40–1.44 inches.

HABITAT.—New Mexico.

This species is so decidedly and remarkably marked that no mistake in its recognition seems possible. It is evidently referable to this group, but seems to introduce a strong tendency to the style of maculation more general in the following *exsertistigma* group. I have seen only a few specimens, and have not been able to study the male.

Rhynchagrotis vittifrons Grt.

1864. Grt., Proc. Ent. Soc., Phil., III, 527, pl. 5, f. 8, *Noctua*.
1868. Grt., Trans. Am. Ent. Soc., II, 309, *Agrotis*.

Head, thorax, except collar, and primaries smoky blackish; collar and costa to t. p. line creamy white; t. a. line pale, somewhat indistinct, thrice outwardly curved, oblique; t. p. line geminate, pale, included space concolorous; outer line punctiform, the line even and very slightly excurved over the cell; s. t. line lunulate, continued, pale, broadly

marked on costa; a pale streak on submedian vein through the cell; orbicular very small, punctiform; reniform moderate, pale, powdered with rusty red; secondaries white, the veins with dusky scales; beneath whitish, primaries, with a dusky s. t. shade, broadest at costa; secondaries sprinkled with brownish along costa.

Expands 33^{mm}; 1.32 inches.

HABITAT.—Colorado.

Of this peculiar species I have seen but a very few specimens, all very much alike. The male genitalia are as in *placida*, and thus confirm the reference of the species to this group. The gravid females have the abdomen conic, and at first sight do not suggest *cupida*, but a little care will show the evident resemblances even in that sex. There need never be any doubt in the identification of this species.

Rhynchagrotis inelegans Smith.

1890. Smith, Trans. Am. Ent. Soc., XVII, 43, *Agrotis*.

General color dull blackish brown; head and palpi concolorous; collar with a reddish suffusion, more marked at the tip and extending to base of costa of primaries; thorax with base of patagiæ, and the tips of the small anterior and posterior tufts also more reddish and slightly contrasting; primaries with a slight reddish shading basally along costa, else quite uniform, save that the median space is a trifle darker than the rest of the wing; basal line geminate, black, distinct; t. a. line geminate, blackish, distinct, outwardly oblique and quite even, a small outward curve only in the interspaces; t. p. line marked by a geminate black spot on the costa, thence indicated only by the slight contrast between median and subterminal space, outwardly well curved over the reniform, and somewhat incurved below; s. t. line prominent, a narrow, slightly irregular line of yellowish white scales, scarcely interrupted save toward costa and inner margin; claviform faintly marked; ordinary spots moderate in size, normal in form, concolorous, outlined by a narrow line of pale scales surrounding each; secondaries and abdomen smoky fuscous; beneath fuscous powdery, with a reddish shading, more marked on secondaries; an outer interrupted transverse line and a discal spot on secondaries only.

Expands 31^{mm}; 1.25 inches.

HABITAT.—Sierra Nevada, California.

In structural characters this species is nearest to *mirabilis*. The palpi are short, scarcely forming a snout, as in *cupida;* thorax with small anterior and posterior divided crest; abdomen depressed. It is an intermediate form between the *cupida*, *exsertistigma*, and *stellaris* groups, with the wing form of the former, the tufting of the second, and the maculation of the third. Its best place is probably next to *mirabilis*. A single female, in good condition, is before me.

Rhynchagrotis mirabilis. Grt.

1879. Grt., N. Am., Ent. I, 39 *Agrotis.*

Smoky to deep black; thoracic disc discolorous reddish or pale gray, reniform contrasting creamy white. T. a. line much as in *cupida*, and tolerably well marked. T. p. line indicated by a sparse powdering of pale scales. S. t. line defined by pale scales; terminal space slightly powdered with gray. A distinct narrow deep black line from base to t. a. line. All from t. a. line to reniform black, the orbicular absorbed or appearing as a mere pale point.

Expands 36 mm; 1.45 inches.

HABITAT.—Colorado and Arizona.

An odd species of which I have not seen a ♂. It differs from all the other species save *inelegans*, by having distinct anterior and posterior thoracic tufts which are rendered prominent by their contrasting color. Yet the species so evidently belongs here by the general shape, that I felt no hesitation in leaving it as an aberrant member, leading to the *stellaris* type.

The ♂ genitalia I doubt not will be found to conform in all essential respects to the *placida* type.

Group EXSERTISTIGMA.

Front narrow, subequal, scarcely wider superiorly, smooth. Antennæ simple, ciliate in the ♂. Second joint of palpi so clothed as to form a club at tip. Thorax subquadrate vestiture smooth; a distinct anterior and posterior divided tuft, collar often slightly produced at middle. The genital pieces of ♂, while referable to the same structural type, yet show considerable variation. The distinguishing feature is a broad slightly excavate corneous harpe, more or less prolonged into a finger-like projection superiorly; margin sinuate to inferior angle which is more or less distinctly and acutely indicated. From this main shank there arises some distance from the end, a chitinous base, superiorly prolonged into a curved process of varying size and shape. Reference to the figures on Plate II will better explain the structures. Each examined species has some little peculiarity of its own, and no two are exactly alike.

The primaries are variable in length and shape, and run from the form typical in the *cupida* group, to that found in the *stellaris* section. In ornamentation they all agree in the trigonate orbicular which is open superiorly; usually also the costa is more or less distinctly pallid, and as a rule the cell between the ordinary spots is black, or at least darker.

Closely allied therefore in habitus and essential structural characters to the *cupida* group, yet the ornamentation alone, combined, to except *mirabilis*, with the thoracic tufting, will serve to distinguish it.

The chief difficulty in dealing with this group has not been in the separation of the species from the material at hand, for that was easy, but in the identification of the species described by Mr. Grote. Some

of the descriptions most obviously confound two or more species, and again there is very little doubt but that every one of the species has been described more than once. Still with the descriptions alone, I would have made out fairly well, but I was again thoroughly upset by the remarkable identifications made by Mr. Grote, and the unreliability of the word "type" on some of the labels, insects bearing them not agreeing at all with the description.

I found the *exsertistigma* of Mr. Tepper's collection to equal the *observabilis* of the Neumoegen collection, while the *exsertistigma* of the Neumoegen collection was different from that of the Tepper collection, and neither of them was like the type in Mr. Græf's collection. The *discoidalis* of Mr. Hulst's collection is the *observabilis* of the Græf collection, but not of the Neumoegen collection, and the type in Mr. Edwards's collection is entirely different from any I have seen so named. So also the *facula* of the Neumoegen collection is different from the same species in the Edwards collection.

Some of the absolute types were inaccessible to me, and under the circumstances I have named all the species that I could not positively identify, and have given all of Mr. Grote's original descriptions for comparison. I fully expect that all the names here given by me will fall into the synonymy, but they will at least have served their purpose of positively separating the forms, and at some future time when comparisons can be made in Mr. Grote's collection in the British Museum the rectification of the synonymy can be easily noted here.

The species of the group divide readily into two sections, according as the collar is or is not black tipped.

In the series with the collar black tipped, *exsertistigma* is distinguished by the pale luteous gray color, the elongate primaries, and the depressed form.

Formalis is smaller, much more robust, shorter winged, and dark red brown or purplish in color. To this I refer *insularis* positively from the type and the description. *Emarginata* is almost certainly a form of this species without the gray shaded costa. I did not find the species in Mr. Edwards's collection, from which it was described.

Carissima Harv. was referred by its describer as allied to *formalis*, and the description is comparative and entirely insufficient to identify the species. Mr. Grote broke up Dr. Harvey's association of the species, and placed it with *intrita* and *rava*, so that the description becomes worse than useless.

Binominalis is bright red, the collar is slightly produced at middle, the tufts are very distinct, and the apices of primaries are more evident than in either of the preceding forms.

Observabilis is a species that I have not been able to identify. Mr. Grote's identifications in no case agree with his description of this species, and I have seen no specimens to agree with it. The color is dark blackish brown, the reniform dusky, and the terminal space pale, oliva-

ceous; strongly distinctive features. The remainder of the species have the collar concolorous and not black tipped.

Facula **represents** ***formalis*** of the first group in wing form and general habitus.

Distracta represents *exsertistigma* of the previous section in color and sordid, depressed appearance. It is powdery, but the powdering is evenly distributed, the s. t. space not contrasting.

Discoidalis is much like the preceding in color and habitus, but is less depressed, scarcely powdery, the s. t. space distinctly darker than the rest of the wing, and the orbicular nearly complete.

Crenulata and *confusa* agree in distinct tufting, somewhat prominent collar and produced apices of primaries, differing from each other by the dark color and concolorous costa of the former, and the bright red color and pallid costa of the latter.

Costata was referred to this series by Mr. Grote, comparing it with *exsertistigma* (*confusa*), and it may refer to my species. He says, however, that the t. p. line is single, finely lunulata, and that the collar has a black line—features which seem to indicate rather the *tesselata* group where there are a number of species with the same general type of maculation.

In tabular form the species autoptically known to me are as follows:

SYNOPSIS OF SPECIES.

Collar broadly black at tip.
- Smoky brown; costa, transverse lines and outer margin luteous...EXSERTISTIGMA.
- Dark purplish or gray brown; transverse lines distinct; robust; primaries short, rounded outwardly.....FORMALIS.
- Red brown; transverse lines feebly marked; t. p. hardly traceable; less robust; primaries more elongate, and produced at apex.....BINOMINALIS.

Collar not tipped with black.
- Robust; abdomen short, plump; primaries short, outwardly rounded; dark blackish brown, lines faint.....FACULA.
- Less robust; primaries longer; abdomen more slender.
  - T. a. lines crossing the costal space, which is not strongly contrasting in color.
    - Dull luteous, powdered with black; s. t. space not darker than median pace, DISTRACTA.
    - S. t. space darkest, orbicular tending to become complete superiorly, DISCOIDALIS.
    - Deep purplish brown; s. t. space evidently paler than median space, CRENULATA.
  - T. a. lines not crossing the broadly pallid costa.
    - Bright red brown, costa and collar yellow.....CONFUSA.

Rhynchagrotis exsertistigma Morr.

1874. Morr. Proc., Bost. Soc. N. H., XVII, 166, *Agrotis*.
1875. Grt., Can. Ent., VII, 26, *alternata*.
1875. Grt., Can. Ent., VII, 101, an sp. dist. *alternata*.
1875. Grt., Bull. Buff. Soc. N. Sci., II, 303 an sp. dist.
1876. Grt., Bull. Buff. Soc. N. Sci., III, 79, *Agrotis*.
1887. Smith, Proc. U. S. Nat. Mus., X, 450, *Agrotis*.

Color dark clay yellow, median and submedian spaces darker, and powdered with dark fuscous or blackish. Thorax with a shade of

brown added, collar pale inferiorly, broadly tipped with black. Abdomen and secondaries dull fuscous. Transverse lines evident, geminate; t. a. line not crossing the paler costal space, the inner line running in an even curve from the submedian vein to base. Claviform pale. T. p. line evenly sinuate, included space pale. Ordinary spots concolorous, outlined by a paler line. The terminal space is paler than the s. t. space, and except as marked by this contrast, the s. t. line is not evident. Costal part of s. t. space darkest. Beneath, dull fuscous, with costal and outer margin powdered with blackish and with an extra discal line and discal lunate spot on each wing.

Expands 37^{mm}; 1.5 inches.

HABITAT.—California.

The above description was made from Mr. Morrison's type which is a female. Mr. Morrison's original description is very brief, and is as follows:

"This species resembles the eastern *alternata*, Grote, but it can be separated by the following characters: Orbicular spot open above, not subquadrate as in *alternata*. The median space is suffused with black. Claviform spot distinct and disconcolorous. The exterior line is drawn in below the cell; and lastly the collar is black above, whitish and contrasting below."

Judging from the above description Mr. Grote promptly referred the species to *alternata* as a synonym. Later, on receiving a specimen from Mr. Morrison, marked *exsertistigma* he withdraws this reference and offers a description essentially different as to coloration. Still later Mr. Grote learned that the specimen sent him by Mr. Morrison was not like the type, and he seems never to have really recognized Mr. Morrison's species. The result is the confusion indicated in the preliminary remarks on this group.

Mr. Morrison's comparisons are really very apt and the species is a good one. The thoracic tuftings are small, and the whole insect appears depressed, abdomen flattened.

None of Mr. Grote's remarks apply to this species and the figure in the Buff. Bull. refers to the form I have named *suffusa*.

Rhynchagrotis formalis Grote.

1874. Grt., Bull. Buff. Soc. Nat. Sci., II, 61, *Agrotis*.
1878. Grt., Bull.., Surv., IV, 174, *Agrotis*.
1-87. Smith, Proc. U. S. Nat. Mus., X, 450.
var. INSULARIS Grote.
1876. Grt., Bull. Buff. Soc. Nat. Sci., III, 82, *Agrotis*.

"♂ An exceedingly dark and beautiful species, with silky squamination and somewhat flattened form, and allied to our eastern *A. collaris* and *A. geniculata*, middle and hind tibiæ alone spinose, dark, intense black-

ish-brown. The collar has a narrow central pure white line, above which the prothoracic pieces are velvety black; primaries with the costal edge broadly dark ashen to the inception of the t. p. line, absorbing the superior portion of the orbicular spot; reniform gray, like the costal edge, moderate, with faint dark internal ring; ordinary lines geminate, fine, not very distinct or complete, black; the t. a. line waved, nearly perpendicular; the basal half line visible on the gray costal edge; the t. p. line roundly but not greatly exserted opposite the cell, followed by minute black and white points on the subterminal space; median space with a more ruddy brown tinge than the rest of the wing and like the thorax and tegulæ; the faintly pale subterminal line is shaded with brown and the dark fringes are brown at base and show a faint interior line; hind wings blackish without marks, with white-tipped fuscous fringes that show a broad interior line; abdomen blackish; beneath the wings are a little paler, irrorate, with a rather distinct blackish common line and black discal marks on the hind wings."

Expands 35^{mm}; 1.40 inches.

The above is Mr. Grote's description of *formalis*. The form *insularis* is described as follows:

"♀ Purple red brown with ashen costal region crossed by the geminate black transverse lines; stigmata concolorous; cell between them and before the orbicular black; reniform narrowly edged with pale, a black sub-basal curved dash, course of the lines as in *exsertistigma*, collar ashen; thorax red brown; hind wings fuscous with interlined fringes: allied to *exsertistigma*; differs in color and in the black lines, and in the more bent subterminal followed by pale points, as well as in the more rounded orbicular."

Expands 34^{mm}; 1.36 inches.

A long series of specimens from California and Vancouver prove these forms identical. The black filling of the cell is not constant and varies from a mere shade to a distinct black filling, the latter being the more usual. In the type form the costa and ordinary spots are dark gray, and the claviform is very faintly marked; the median space has a more evident reddish brown cast and the secondaries are blackish. In the variety *insularis* the color is more evenly red brown, the collar not black above but darker than the inferior portion which is tinged with yellowish, as is the costa. The ordinary spots are concolorous, outlined by the black filling of the cell, and a few yellowish scales; the secondaries have a yellowish tint. All intermediate forms are found in both sexes, and I have no doubt of their identity. The genitalia of the male are alike in both forms; they are peculiar in having the inferior angle of the harpes rounded and the clasper unusually long and strongly curved.

In my own experience the species varies in size from 35–37^{mm}, 1.40–1.48 inches, and it seems not uncommon in California, Vancouver, and British Columbia.

Rhynchagrotis emarginata Grt.

1876. Grt., Bull. Buff. Soc. N. Sci., III, 82 *Agrotis.*
1878. Grt., Bull. Surv., IV, 174 *Agrotis.*

"♀ Resembling *insularis*, but without pale margin to primaries; abdomen flattened; this and the following species [*facula*] with *insularis* are nearest to *formalis*. Wings narrower than in *carissima*. Dark purple brown. Collar surmounted by a narrow black line. Stigmata concolorous, subequal, narrowly pale margined. Lines black, geminate, indicated on costal region, else faint, no black marks or shades. Orbicular open to costa. Hind wings darks fuscous with interlined fringes. Beneath paler; costal regions stained with purplish; common line and discal marks on hind wings. Abdomen dark fuscous above; purple stained beneath.

"Expanse 33^{mm}. No. 784, California, Mr. Hy. Edwards."

This may be *formalis* or *insularis* but may also be a good species, since some of the forms in this group are very closely allied.

In Bull. Surv., IV, 174, Mr. Grote gives as distinctive: "Rather narrow-winged, dark purple brown; concolorous; ornamentation subobsolete; lines darker than the wing; orbicular incomplete above. Collar with a distinct, black superior edging."

This indicates almost certainly one of the evenly colored forms of *formalis*.

Rhynchagrotis carissima Harv.

1875. Harv., in Grt. check list, p. 25.

"♂ Allied to *formalis*. Head, thorax, fore wings, and body beneath stained of a reddish purple over fuscous. Veins marked with blackish; lines obsolete, geminate, marked by included paler tint; stigmata obsolete; collar with a jet black contrasting band. Beneath the wings are blackish, irrorate; hind wings paler with line and small discal mark. California. Expanse, 34^{mm}."

Except as a comparative description this is very incomplete. Assuming that the species is really related to *formalis* this description applies to a specimen of *insularis* Grt., before me. But Mr. Grote, who had an opportunity of knowing all of Dr. Harvey's types, and who, indeed, obtained possession of most of them, places this species near to *intrita* and *rava*, and far from the species with which it is compared. This makes me doubtful whether the suspicion of identity with *insularis* is correct; but since Dr. Harvey is usually very accurate I retain the species where he originally placed it. I have never seen a species marked *carissima* in collections, and the type is probably in Mr. Grote's collection in the British Museum.

Rhynchagrotis binominalis Smith.

1887. Smith, Proc. U. S. Nat. Mus., x, 451, *Agrotis. exsertistigma*, ‡ Grt.
1875. Grt., Can. Ent., VII, 26, *Agrotis.*
1887. Smith, Proc. U. S. Nat. Mus., x, 461, pr. syn.

Primaries red brown; costa and collar inferiorly yellowish; collar tipped with black; cell around the ordinary spots black. Transverse lines geminate; t. a. line not crossing costal pale space, else distinct; t. p. line punctiform, barely traceable; s. t. line pale, interrupted, powdery. Ordinary spots pale-ringed, orbicular invaded by costal pale space; reniform slightly cinereous; claviform faintly outlined in pale. Abdomen and secondaries smoky fuscous. Harpes of ♂ short and broad, superiorly prolonged into a cylindrical finger-like process; inferiorly into a short acute spur. The clasper consists of a single curved hook from the superior portion of harpes.

Expands 38mm; 1.5 inches.

HABITAT.—California, Washington.

This is the *exsertistigma* of the Edwards collection, and like one specimen so labeled in Mr. Tepper's collection. The typical *exsertistigma* is, as Mr. Morrison described it, much like *alternata* in color and appearance.

The primaries are also more produced and have the outer margin more oblique, apex rectangular. The body is not depressed. The harpes, as compared with *formalis*, differ in the produced inferior angle and the comparatively shorter and less curved clasper.

The species seems not rare.

Rhynchagrotis observabilis Grt.

1875. Grt., Can. Ent., VII, 144 *Agrotis.*
1878. Grt., Bull. Surv., IV, 174 *Agrotis.*
1887. Smith, Proc. U. S. Nat. Mus., x, 451 *Agrotis.*

" ♀ Fore tibiæ unarmed; middle and hind tibiæ spinose. By the flattened abdomen allied to *cupidissima*. Fore wings dark blackish brown, with the terminal space paler, somewhat olivaceous. As in *exsertistigma*, the orbicular is open, triangulate, broadly pale margined, fusing superiorly with a pale subcostal shade extending from the base of the wing above this spot. Unlike *exsertistigma*, the *orbicular* and *reniform* are black, the ground color of the median space about them being powdered with deep yellow. A black basal dash before the geminate, waved t. a. line; the latter interrupted by the subcostal shade, and with an interior pale shading. Claviform moderate, pale-edged. T. p. geminate, the inner line scalloped, the outer even, inclosing a rather broad pale space; the line is very slightly sinuate, not depressed opposite the cell. Subterminal line nearly straight, dark, with a very pale powdery exterior shade. Subterminal space darker shaded on costa, relieving the

costal dots distinctly. Terminal line dentate. Hind wings dark fuscous, with pale interlined fringes. Beneath quite pale, faintly ruddy and subirrorate, with common exterior line fading towards internal margins and discal marks. Collar pale, edged behind with black; tegulæ blackish."

"Expanse, 35mm."

HABITAT.—California (Behreus, No. 376).

Afterward, in the Bull. Surv., IV, 174, Mr. Grote says: "Collar with upper half black; lower part reddish or ochery. Costal margin reddish; varies by the presence of black on the cell and before the orbicular, or its absence when these places are sometimes olivaceous or reddish. A black basal dash; claviform distinct. The collar is similar to *formalis*, but the color is different, being fuscous, overlaid with reddish and olivaceous."

This species I do not know at all. Mr. Grote has labeled three different species with this name, and neither one agrees with his description. In Proc. U. S. National Museum, x, 451, I place this species in the synoptic table with *facula* on the faith of a specimen labeled by Mr. Grote and marked type, I believe, in Mr. Graef's collection. But it does not at all agree with the description, which could not possibly have been drawn from that specimen. I have therefore called it *distracta*.

I shall expect to find the type of this species the same as Mr. Morrison's *exsertistigma*.

Rhynchagrotis facula Grote.

1876. Grt., Bull. Buff. Soc. Nat. Sci., III, 82, *Agrotis*.
1878. Grt., Bull. Surv. IV, 174, *Agrotis*.
1837. Smith, Proc. U. S. Nat. Mus., X, 451, *Agrotis*.

"♀ Dark purple brown; a slight ashen costal shade invades the stigmata. Resembles *formalis* in color and ornamentation. It differs by the black filling in on the cell, by the absence of the black band and central white line on the collar, which is concolorous with the dark brown thorax, and only shows a superior black edging. The geminate lines occupy their usual position. The orbicular is open. There is an abdominal *carina*. Hind wings blackish fuscous. These species seem to lead into the *cupida* group of the genus."

To Mr. Grote's description I would add that the ordinary spots are narrowly outlined with pale scales: t. a. line complete, oblique with three slight out-curves; t. p. line punctiform, rather indistinct, evenly sinuate; s. t. line consisting of a series of pale yellow, powdery dots.

Expands 31–34mm; 1.25–1.35 inches.

HABITAT.—California, British Columbia.

This species is easily recognized by the very uniform dark color, the plump, heavy body, the rather short, robust primaries and short abdo-

[illegible] are like those of *osseravilis*. As Mr. Grote [illegible] specimens [illegible] *formalis* except for the concolorous [illegible] filling in of the cell is not distinctive.

Rhynchagrotis distracta Smith, sp. nov.

[illegible]

[illegible] Nat. Mus. x 45.

[illegible] grayish, more or less powdered with blackish. Costa [illegible] space strongly powdered with black, but not darker [illegible] space. Cell as usual, black or dark filled. Transverse [illegible] complete, course as in the preceding species. [illegible] emphasized by a black costal patch and a slight preceding [illegible] Secondaries fuscous. Collar concolorous.

[illegible]: 1.25–1.30 inches.

[illegible] Washington, Oregon, California.

[illegible] direction of a more even color, the black powderings [illegible] cell not black though dusky. The species has a peculiar appearance, and the dense blackish atoms with which it [illegible] add to this appearance. It is not unlike *exertisigma* in [illegible] habitus though evidently distinct by the concolorous collar. [illegible] of the forms which was marked *osseravilis* by Mr. Grote. [illegible] so referred as above cited.

[illegible] of the male have the superior process somewhat lengthened [illegible] somewhat clavate, and the inferior angle acute. The clasper is [illegible] short and rather thick.

Rhynchagrotis discoidalis Grt.

1876. Grt., Bul. Buf. Soc. Nat. Sci., III, 2, pl. 4, f. 9. *Agrotis.*

"Fore tibiæ unarmed; appearing allied to *attenta*. Fuscous or [illegible] brown. The geminate lines as usual in this group. Cell black. [illegible] *nata* concolorous; orbicular elongate-ovate; reniform upright. [illegible] terminal space the darkest. The general color is fuscous with a [illegible] shade except on subterminal space. The distinctive character of [illegible] species is the black shading around the orbicular of the cell. [illegible] is a trace of the claviform. Hind wings pale fuscous with interlined fringes and the veins marked. Beneath paler with a faint line [illegible] discal mark."

Expands 37 mm.: 1.5 inches.

HABITAT.—Nevada.

This is slightly darker, more grayish than *distracta*, with which Mr. Grote has also confused it. This species differs in the more even coloration, the less distinct transverse lines, the dark, uniform s. t. space, and in the tendency of the orbicular to close superiorly. This last character is peculiar in this section, and while the species undoubtedly

belongs here, I should not be surprised to find a considerable modification of the male genitalia when that sex is studied. Unfortunately I had no male.

Rhynchagrotis crenulata Smith.

1887. Smith, Proc., U. S. Nat. Mus., x, 451, *Agrotis.*

Primaries deep dark brown; basal and s. t. space slightly paler, powdered with gray; costal space paler red brown; ordinary spots powdered with gray; claviform outlined with pale yellow scales. Transverse lines distinct; t. a. lines geminate, included space pale; t. p. line crenulate, course as in the preceding species; s. t. line distinct, pale yellowish, punctiform. Basal black dash distinct; cell black. Secondaries smoky fuscous. Harpes of ♂ as in the preceding species; but the projections at upper and inferior angles are longer, and there is an additional curved slender projection from upper margin. The clasper is lacking, but is replaced by a quadrate corneous plate. The additional projection of side piece probably serves the same purpose as the clasper of preceding species.

Expands 35^{mm}; 1.4 inches.

HABITAT.—California.

This is the *facula* of Mr. Neumoegen's collection, so named by Mr. Grote. The differences are so obvious, that there seems scarcely an excuse for the error. The difference in the ♂ genitalia is very decided also.

In the latter character this species and *confusa* agree closely, and they differ from all the preceding by the additional finger-like process of the harpes and by lacking the corneous hook of the clasper, the latter being represented by a subquadrate, slightly projecting plate.

Since the above was first described I have seen many specimens and there is a possibility that perhaps this species and the following—*confusa*—may turn out to be identical. I am not ready to say that it is so, but as the genitalia agree, and the difference is in maculation merely, there is a strong likelihood that it may be so.

Rhynchagrotis confusa Smith.

1887. Proc. U. S. Nat. Mus., x, 452, *Agrotis.*
exsertistigma ‡ Grt.
1876. Grt., Bull. Buff. Soc. Nat. Sci., III, 79, Pl. 4, f. 8.

Bright red brown; costa and collar broadly pale yellow; cell before and between the ordinary spots black; ordinary spots concolorous, narrowly annulate with pale yellow; claviform outlined in same way. T. a. line distinct, not crossing costal pale space, but incurved to base; t. p. line punctiform, indistinct, geminate, included space paler; s. t. line pale yellow, narrow, powdery, emphasized by the somewhat darker

brown s. t. space. Secondaries fuscous; ♂ genitalia essentially as in *crenulata*.

Expands 37mm; 1.5 inches.

HABITAT.—Washington.

This is the form labeled *exsertistigma* by Mr. Grote in collection Graef and Neumoegen, and Mr. Tepper also had a specimen associated with *binominalis* under the same title. The superficial resemblance between *binominalis* and *confusa* is very close, but the species are undoubtedly distinct. The black collar of *binominalis* is distinctive and the difference in the genitalia is strongly marked. Four specimens of ♂ and ♀ from Messrs. Graef, Tepper, and Neumoegen examined.

Rhynchagrotis costata Grt.

1876. Grt., Bull. Buff. Soc. N. Sci., III, 80, *Agrotis*.

"♀ Allied to the preceding [*exsertistigma confusa* mihi] but of a bright red brown. The costa broadly pallid, as is the open orbicular. The t. p. line is, however, single, dark, finely lunulate. The veins are slightly indicated. The inconspicuous, linear, dark subterminal, is near the margin. Collar with a black line. Thorax red brown, in my type not well preserved. Hind wings concolorous fuscous. Beneath, fuscous, with common line and dots."

Expands 35mm; Vancouver Island. Mr. Edwards, No. 4640.

The type is not in Mr. Edwards's collection, and Mr. Edwards states that Mr. Grote borrowed quite a number of his types for further study, and never returned them; probably they are now in the British Museum.

The present species can not well be identified except by examination of the type, for there are certainly three species confused by Mr. Grote under the name *exsertistigma*, and the fact that a single t. p. line is credited to this species renders the matter still more uncertain. It is, however, more than likely that it is to one of the species I have described as belonging to this group that the description refers.

Genus ADELPHAGROTIS Smith.

Anterior tibiæ not spinose, front smooth, rather narrow, subequal. Thorax robust, subquadrate, the patagiæ smooth, collar rounded; a prominent anterior and distinct posterior tuft. The primaries are moderate in size, with produced apices and oblique, slightly rounded outer margin; antenna of ♂ simple, ciliate. Except of *prasina* no ♂ specimens of the species have been examined: the probabilities, however, are that the genitalia will run to the same type, viz, elongate, membraneous harpes, more or less rounded at tip, and a moderate, strong, curved corneous clasper.

While agreeing in general habitus, the species differ very decidedly, and are recognizable at a glance.

Stellaris and *innotabilis* agree in the bright yellow or creamy white reniform, differing *inter se* by the pale, gray color of primaries and yel-

low collar of the former, and the dark, blackish, brown primaries and black tipped collar of the latter. *Prasina* is well known, and differs from all the other species by its large size and mossy green primaries, on which is a very prominent white patch just beyond the reniform. In this species also the posterior tufts exceed the anterior. The remaining species are abnormally marked. *Apposita* is red brown, the median space is pale, with a yellowish cast, the ordinary spots being subobsolete, while the balance of the primaries is deep brown with a powdering of black scales.

Vernilis and *infimatis* differ from all the others in the gray color, obsolescence of transverse lines, the strigose markings, and elongate, oblong orbicular. They may be distinguished by the dark ground color, complete orbicular and concolorous ground color of costa of *vernilis*, and the paler color, open orbicular and whitish costa of *infimatis*. In the former also the reniform is larger and usually paler than ground color; in the latter it is narrower, lunate, and darker than ground color.

In tabular form the species separate as follows:

Ordinary spots discolorous white or creamy yellow.
  Collar creamy yellow ..... STELLARIS.
  Collar pale, superior half black ..... INNOTABILIS.
Ordinary spots when present not discolorous, contrasting.
  Transverse lines distinct.
    Size large; primaries mossy green, a large white patch beyond reniform, ordinary spots distinct ..... PRASINA.
    Size smaller; primaries dark brown, median space much paler; ordinary spots obsolete ..... APPOSITA.
  Transverse lines obsolete; orbicular elongate, narrow, oblique.
    Dark gray; reniform moderate, rather paler; annulate with paler gray and black; secondaries dusky ..... VERNILIS.
    Paler; reniform narrow, lunate, dusky, not distinctly outlined; secondaries white ..... INFIMATIS.

I have not used the term *Eurois* for this genus, of which *prasina* is perhaps to be considered the type, as subsequent authors have used the term for quite miscellaneous assemblages, and I prefer not to add another meaning to the term at present.

Adelphagrotis stellaris Grt.

1880. Grt., Can. Ent., XII, 153, *Agrotis*.

"♀ varies in color from blackish to reddish purply, nearly as bright as *phyllophora*. Collar yellowish white, discolorous with head and thorax. Palpi with pale third article. Reniform kidney-shaped, yellowish white, discolorous. Orbicular rounded, somewhat irregular and slightly oblique, nearly concolorous with the wing, a little shaded with yellowish, both spots annulate with dark. Lines single, blackish; half line indicated; t. a. line waved; t. p. line lunulate, followed by a pale shade against which the darker veins and faint cloudy pointlets of the

line contrast; s. t. line inaugurated by a diffuse shade on costa, below which the line is exserted and followed by pale points. Hind wings pale, soiled, or fuscous shaded, with terminal line. Beneath with discal marks and common line."

Expands 32–33^{mm}; 1.28–132 inches.

HABITAT.—Nevada, Washington.

I have seen and examined the type specimens in the Graef collection; both are females. The median space is slightly darker and the claviform is indicated by a few pale scales.

I have seen no males, but I have no doubt that they will be found referable to this group by antennal structure. The insect seems rare, and is an easily recognized one.

Adelphagrotis innotabilis Grt.

1874. Grt., Proc. Ac. Nat. Sci. Phil., 26, 202, *Agrotis*.
1880. Grt., Can. Ent., XII, 154, *Agrotis*.
washingtoniensis Grt.
1880. Grt., Bull. U. S. Geol. and Geog. Surv., VI, 259, *Agrotis*.

"This well-marked species resembles at first sight *A. bicarnea* and *A. c-nigrum* from the Atlantic States, but differs by its smaller size and the absence of any carneous costal shades on the fore wings. Blackish; the collar is pale at base and very broadly banded with deep black superiorly. Fore wings with the transverse lines narrow, continued, geminate, accompanied by narrow pale shades. Orbicular small, spherical, lying in a deep black discal shade preceding and following it; reniform moderate, discolorous, ochraceous distinct, of the usual shape, with distinct internal ring; fringes blackish. Hind wings blackish fuscous, paler at base. Beneath paler, with a purply tinge; a faint narrow common line, a little irregular on secondaries, and discal dots. Body parts blackish."

Expanse 33–36^{mm}; 1.32–1.44 inches.

HABITAT.—California (Saucelito).

In the Can. Ent., XII, 154, Mr. Grote says: "This species may be known by the yellow brown reniform, contrasting with the concolorous blackish orbicular. The color is black above, gray below. Specimens from Washington Territory differ from my type from California by the median space being shaded with brown, the claviform outlined, and several very fine black lines cross from the two median lines over the median space inferiorly. The species is allied to *bicarnea*. The orbicular is more or less evidently quadrate and oblique."

In Bull. Surv., VI, 259, Mr. Grote describes *A. washingtoniensis* as follows: "♂ ♀ I have considered this a form of *innotabilis* (Can. Ent., 12, 154), but a larger series of specimens collected by Mr. Morrison in Washington Territory shows no nearer approach to my type of *innotabilis* from California. In *washingtoniensis* the median space is shaded with rich brown, the claviform is outlined, and several fine black lines cross the

median space inferiorly. The orbicular is more oblique and is bright brown, not concolorous as in *innotabilis;* it is somewhat larger and squarer. The collar is bicolorous in both, and else the two species are much alike."

Mr. Grote's first impression was correct, and the two forms refer to the same species. In a series of specimens from California and Washington examined by me all the characters are evanescent, and *innotabilis* shows the same cross lines in the median space, though as it is darker, the lines are very feebly marked and readily overlooked. One of the Washington specimens scarcely differs from typical *innotabilis.*

I had no male available for the study of the genitalia.

Adelphagrotis prasina Fabr.

1787. Fabr., Mant. Ins. II, 169, *Noctua.*
1952. Gn., Noct., II, 75, *Aplecta.*
1874. Grt., Bull. Buff. Soc. N. Sci., II, 163, *Eurois.*
1875. Speyer, Stett. Ent. Zeit., 36, 136, *Aplecta.*

Umber brown, more or less densely covered with mossy green scales, which usually give the predominant color to the primaries. Basal line black, followed by a white shade; t. a. line single, black, oblique, irregular, preceded by a white shade. T. p. line strongly crenulate, obscured at the costal half by a large irregular white patch. At lower part inwardly oblique constricting the median space; followed by a row of black, and then a row of white venular points. S. t. line very irregular, pale green preceded by a darker shade, and superiorly by a few sagittate black points. The claviform is short outlined with black scales. Ordinary spots large, concolorous, annulate with black. Head white with a greenish tinge. Thorax concolorous, tufts somewhat ferruginous. Body and secondaries blackish fuscous.

Expands 45–50^{mm}; 1.75–2 inches.

HABITAT.—New England and Middle States; Europe.

This is one of the few species common to the United States and Europe and is easily distinguished by its large size and the mossy green mottling of primaries and the large white patch beyond the reniform. It is common. The genitalia are simple, and have been referred to in the introduction.

The European synonymy and bibliography are not given, and the insect has been seldom referred to in American publications.

Adelphagrotis apposita Grt.

1878. Grt., Bull. Surv., IV, 170, *Agrotis.*
1883. Grt., Papilio, III, 78, *Agrotis.*

" ♀ Fore tibiæ unarmed. Of a burnt umber brown; thorax darker, median space narrowed, the median lines approximate; t. a. line slightly lobed, outwardly oblique, dark brown, with a broad preceding pale

shade; t. p. line indistinct, narrow, indented opposite the cell, slightly lunulate, followed by a pale shade; the median space paler than the rest of the wing. Orbicular rounded, moderate, with faint black annulus, stained with reddish, and pale; reniform near t. p. line, moderate, with dark and reddish stained center and pale border. Median shade dark and diffuse; claviform obsolete. Fringes concolorous; s. t. line fine and pale. Hind wings dark fuscous, with pale fringes. Beneath pale, with reddish tinge, irrorate; a faint common mesial line near the discal dots, which are small, and appear to be empty; on primaries a subterminal shade."

Expands 34–36^{mm}; 1.36–1.45 inches.

HABITAT.—California, Vancouver.

An easily recognized species of which I have seen females only. It is unlike any other species in the genus, and is distinguished by the pale median and heavily powdered basal and terminal spaces.

Adelphagrotis vernilis Grt.

1879. Grt., Can. Ent., XI, 57, *Agrotis*.
1879. Grt., N. Am. Ent., I, 38, *Agrotis*.

Head, thorax, and primaries dark ash gray, veins marked with blackish; transverse lines obsolete; a black basal dash, modified into the elongate claviform; orbicular slightly paler gray; elongate oval, outlined in black; reniform moderate in size, kidney-shaped; secondaries blackish; beneath, the usual lines and spots are nearly obsolete.

Expands 37^{mm}; 1.5 inches.

HABITAT.—Colorado, Nevada.

Easily distinguished by the simplicity of its maculation; a single ♀ is in Mr. Neumoegen's collection and I have not seen a ♂.

Mr. Grote's original description is diffuse and comparative with *albalis* and other species which differ structually from the present; it is therefore not reproduced here, the above being sufficient to distinguish it from all its associates.

Adelphagrotis infimatis Grt.

1880, Grt., N. Am. Ent., I, 93, *Agrotis*.

Pale ash gray, costal space for half the distance to apex whitish, that color invading the elongate, narrow, open orbicular; a diffuse black basal dash, above sharply limited by the costal white space, medially extended to outline the narrow pale claviform, and curving superiorly to form the lower boundary of the orbicular; reniform narrow, darker, lunate; t. p. line indicated by a double series of venular dots, a diffuse, darker gray, longitudinal median shade, and a triangular darker patch at internal angle, the base of which rests on outer margin; abdomen and secondaries whitish; beneath as usual, save that the extra discal line is unusually crenulate.

Expands 37mm; 1.5 inches.

HABITAT.—California, Washington.

Easily distinguished from the preceding with which only it is likely to be confounded, by the characters previously pointed out. The collar is black lined.

Genus PLATAGROTIS Smith.

Anterior tibia unarmed, front smooth, ♂ antennæ simple, ciliate, abdomen conic; thorax comparatively slight, vestiture rather long and somewhat divergent, no distinct tuftings; primaries trigonate, ample, with moderately convex or nearly straight costal margin; apex somewhat produced or rectangular.

The maculation in all the species is distinct, all the normal markings being present. The colors are various shades of gray to black, *imperita* only having a distinct brownish tint and a reddish shade over the reniform, which is characteristic; the species are all of good size and rather easily distinguished, not only by the maculation but by the ♂ genitalia which are different in each examined species. *Speciosa* is largest and rather the slightest of the species, showing indeed so little of the typical *agrotid* appearance that Mr. Morrison was excusable for not at once recognizing the species as belonging to this genus. The color is a dark somewhat smoky gray and the maculation is white; the ♂ genitalia consists of broad harpes rounded at tip and with an obtuse inferior projection enveloping the lower branch of the bifid clasper; the clasper is stout and corneous, attached to the harpes, and with two very unequal branches; the inferior is short, thick, obtuse, straight; the superior is much longer, stout, and slightly curved. *Pressa* is a smaller species much paler in color, comparatively less robust, the maculation dark; the harpes of the male are rather long and broad, the tip evenly rounded, and as in the preceding species furnished inwardly with a row of spinules; the clasper is free from the harpes, but is very small; inferiorly the angle is rectangular, superiorly there is but a short finger-like projection. *Trabalis* is a slightly larger form than *pressa*, as pale in color, and distinguished by the large whitish ordinary spots and a yellowish-brown shade through s. t. space; of this species I have seen no ♂, but probably the genitalia are much as in the following species. *Imperita* is easily distinguished from all the others in the group by the brownish tint and reddish shade over the reniform; the ♂ genitalia are peculiar in the shape of the harpes, which are heavier than usual and emarginate at tip, the upper finger of the emargination being decidedly the longest; the clasper is free, in general shape like *speciosa*, but the branches are more equal, the inferior longer, and the superior shorter and less curved than in *speciosa*. *Sincera* is an even pale gray form, somewhat irrorate with black, the transverse lines rather broad, very distinct; s. t. line preceded by sagittate black dashes; the ♂ genitalia are almost precisely like those of *imperita*.

The following table will aid in separating the species:

Largest; apex distinctly produced; color, dark gray to blackish; transverse lines, contrasting white ..... SPECIOSA.
Smaller; primaries with a yellowish tint; transverse maculation, dark ..... PRESSA.
Apex of primaries, rectangular; wings, more abruptly widening at base.
Ordinary spots, whitish; s. t. space, yellowish brown; s. t. line not preceded by sagittate dashes ..... TRABALIS.
Orbicular whitish, reniform dusky; even gray, lines very distinct; s. t. line preceded by black sagittate dashes ..... SINCERA.
Orbicular suffused with reddish; s. t. space very narrow, gray ..... IMPERITA.

Platagrotis speciosa Hbn.

1815. Hubn., Lep. Eur. Noct., 491, *Noctua.*
1816. Hubn., Verzeichniss, 218, *Eurois.*
1852. Gn., Sp. Gen. Noct., II, 80, *Aplecta.*
1866. Moeschl., Wien. Ent. Monatschr. VIII, 199, *Agrotis.*
1883. Moeschl., Stett. Ent. Zeit., 44, 117, *Agrotis.*
perquirita Morr.
1874. Morr. Proc. Bost. Soc. Nat. Hist., 17, 136, *Polia.*
1880. Grt., Bull. Bkln. Ent. Soc., III, 37, pr. syn.
baileyana Grt.
1879. Grt., N. Am. Ent., I, 92, *Agrotis.*
1880. Grt. Can. Ent., XII, 185, per syn.
1880. Grt., Bull. Bkln. Ent. Soc., III, 37, per syn.
mixta Wlk.
1856. Wlk., C. B. Mus. Lep., IX, 62, *Acronycta.*
1882. Grt., Ill. Essay, 39, pr. syn.
var. ARCTICA Zett.
1839. Zett., Ins. Lapl., 339.
1864. Wlk., Stett. Ent. Zeit., 180, pr. var.

Dark gray to blackish, somewhat powdery. Transverse lines all distinct, accompanied by a broad white shade. Basal line distinct; t. a. line outwardly oblique, irregular. T. p. line crenulate, nearly parallel with outer margin. S. t. line narrow, even, in pale specimens obsolete, marked by a row of variably sized black spots. Claviform small, concolorous, outlined in black; orbicular large, rather oblique, oblong, whitish powdered with ground color; reniform moderate, concolorous annulate with white. Thorax mixed with considerable white. Secondaries dirty, somewhat yellowish gray. Beneath powdery with a distinct irregular common line and discal lunule. The latter more distinct on secondaries.

Expands 46^{mm}; 1.75 inches.

HABITAT.—Mountainous districts of Europe, Canada, Adirondacks, White Mountains, Vermont.

This is a very peculiar species for an *Agrotis*, and, though so well marked is rich in synonyms. *Arctica* is applied to the dark, evenly colored forms in which the white shades are narrow, and the ordinary spots somewhat reduced in size.

It has been received from Labrador, and is one of the circumpolar species extending south to the mountains of northern New York.

Platagrotis pressa Grt.

1874. Grt., Trans. Am., Ent. Soc., v, 90, *Eurois.*
1875. Grt., Check-List, pl. 1, f. 7, *Eurois.*

"* * * The middle and hind tibiæ are spinose. The antennæ simple, scaled above, and setose beneath, not brushlike in the male. The color is a dusky gray, and the species shows an affinity with *E. herbida* [*prasina*] by the primaries being more or less shaded with green, principally from the base outwardly over the reniform, and along the submedian interspace. Orbicular large, round, oblique, black ringed, with pale center and an internal annulus; the discal space around the spot and before the reniform is more or less noticeably filled in with black. Reniform also pale, with fainter internal ringlets, black ringed, well sized. The transverse lines are obsoletely geminate, filled in with white and this filling in rather strikes the eye and seems to be characteristic. The claviform is large, its upper black edge appears as a black arcuate line below the median vein, its lower edge is indistinct. The subterminal line is more or less obviously preceded by black shade dashes, usually determinate in pairs on submedian fold, between veins 4 and 6 and again subcostally; a dentate black terminal line defines the uneven margin of the wing; fringes gray. Hind wings very pale, shaded with fuscous terminally, with an irregular faint median fuscous line and black terminal linear edging; fringes whitish. Beneath very pale, subirrorate and shaded with fuscous, with a common line and discal marks. Palpi with the terminal joint white, the second black on the sides. Head whitish; thorax mixed with black. Abdomen weak, untufted."

Expands 34–36^{mm}.; 1.36–1.44 inches.

HABITAT.—Canada, Northern, Eastern and Western States. This species, though widely distributed, is not common, single specimens only being received. The differences separating it from *speciosa* have been already pointed out; the smaller size and paler color are the most obvious features.

Platagrotis traballs Grt.

1877. Grt., Can. Ent., IX, 198, *Agrotis.*

"Whitish gray, with large stigmata and bright brown contrasting subterminal space. A basal black dash, a second above it on the cell, before the orbicular, which latter is near the t. a. line, inaugurated above it on costa by two black lines rather wide apart, with white included space. Below the t. a. line is twice waved to internal margin. Basal space whitish; basal line indicated. Sub-basal space dark gray.

Stigmata concolorous, ringed with black, very large. Claviform incomplete; orbicular a little flattened, ovate; reniform moderately excavate. T. p. line narrow, geminate, regularly and slightly scalloped, with a deeper incision opposite the cell. Subterminal space rather wide, bright brown; s. t. line faint, pale; terminal space rather narrow, dark gray. A dentate black, continuous terminal line. Hind wings pale gray, fuscous, with pale fringes touched with blackish at extremity of veins; a black terminal line. Beneath pale, powdered with dark scales; an indistinct common outer line; discal lunule filled in and prominent on hind wings, empty on primaries. Abdomen pale; thorax gray, darker shaded on tegulæ. Second palpal joint outwardly black. Front white inferiorly below a frontal black line. The collar has no transverse black line, but is tipped with a darker shade."

"A second specimen * * * has the wings more obscure, the brown subterminal improminent. In the type there is merely a black line inferiorly connecting the stigmata along the median vein. In the Canadian specimen the orbicular and reniform are also connected superiorly with a black line. The lunate discal mark beneath on hind wings, distinct and large; on the primaries empty in both specimens. The common exterior shade line on the primaries is even, on hind wings, irregular."

Expands 39–42^{mm}; 1.56–1.68 inches.

HABITAT.—Massachusetts, Canada, "Middle and Eastern States."

Easily distinguished by the unusually large and pale ordinary spots. It seems rare, though I have received it a number of times for identification. Mr. Thaxter found the cocoon from which the type emerged under pine bark in April, when the larva had not yet become pupa. The cocoon was tough, not unlike that of *Cerura*. Larva dull white, with blackish markings.

Platagrotis sincera H. Sch.

1881. H. Sch., Eur., Schmett, II, 412, *Agrotis*.

Rather even gray, somewhat irrorate with black. Median line very distinct, single. T. a. line with a single outward curve from costa to vein 1, and a small curve thence to hind margin. T. p. line lunulate, outwardly curved to vein 3, then inward to inner margin; the curves more distinct than in *trabalis*, its near ally. S. t. line even, concolorous, marked by a row of preceding sagittate spots. A row of terminal lunules. Claviform small, narrow, black marked. Orbicular large round, whitish, reniform rather narrow, dusky, touching the orbicular. Secondaries pale fuscous, marked by a faint double exterior line. Beneath powdery, a distinct dusky transverse line and discal lunule. Head and thorax concolorous.

Expands 39^{mm}; 1.5 inches.

HABITAT.—Labrador.

To Mr. Moeschler I owe a specimen of this species, and it is upon his authority that I have included the species as American. It is perfectly distinct from any other American form.

Platagrotis imperita Hübn.

1823. Hübn., Zutraege, 447, 448, *Ogygia.*
1880. Grt., Can. Ent., XII, 118, *Agrotis.*
comparata Moeschl.
1862. Moeschl., Wien. Ent. Mon., VI, 131; pl. 1, f. 5, *Agrotis.*
saxigena Morr.
1874. Morr., Proc. Bost. Soc., N. H., 17, 162, *Agrotis.*

Dark, somewhat fuscous or reddish brown, more or less irrorate with gray scales. Transverse lines darker, accompanied by gray shades. T. a. line rather even, outwardly oblique; t. p. line as in *trabalis* but less distinct and much nearer the s. t. line. The latter is dark, broad, and irregular. S. t. space strongly irrorate with gray. Ordinary spots large; orbicular gray, reniform discolorous reddish. Claviform small, outlined in black. Secondaries smoky fuscous. Beneath as in the preceding species but much darker. Thorax concolorous with primaries, collar tipped with white.

Expands 37^{mm}; 1.5 inches.

HABITAT.—Labrador and mountains of Northern and Eastern States.

This is an easily recognized species, the characters of which have been already fully given. It is not common. The generic term *Ogygia* may have to replace *Platagrotis* if the type of *Ogygia* is *imperita*, of which I am not sure.

Genus EUERETAGROTIS Smith.

Fore tibia unarmed. Head moderate, rather small, front subequal. Antennæ simple in ♀, slightly serrate, and finely ciliate in the ♂. Thorax with a distinct divided crest, more prominent, and forming distinct apical and basal tufts. Collar slightly produced at middle. Primaries wide, costa distinctly arched, outer margin obliquely rounded. The ordinary spots are normal.

The genitalia of the ♂ are after one general type. The harpes are superiorly prolonged, terminating acutely; in *sigmoides*, rather evenly dilating backward and somewhat twisted; in *perattenta* the upper margin is tolerably straight, the inferior margin very irregular. Both forms are provided with a long corneous curved hook or clasper.

In wing form and in the type of ♂ genitalia this group is allied perhaps most nearly to the *badicollis* section.

Three species are contained in it which are easily separated. *Sigmoides* and *perattenta* have the cell between the ordinary spots black; *attenta* is without this peculiarity, and the transverse lines tend to become obsolete. Of the first two, *sigmoides* is distinguished by its larger size and the prominent discolorous tuftings of thorax.

The species are all eastern, and rather northern, and are not rare.

Eueretagrotis sigmoides Gn.

1852. Gn., Sp. Gen. Noct., I, 325, *Noctua*.
1856. Wlk., Cat. B. Mus. Het., X, 400, *Graphiphora*.

Ground color smoky brown; costa to t. p. line, and apex paler, yellowish. Cell before and between the ordinary spots, black; a black basal dash. T. a. line outwardly oblique, dentate, geminate, black, included space yellowish. T. p. line faintly geminate, lunulate, interrupted, slightly sinuate inwardly, with pale included shade. S. t. line pale, irregular; inwardly marked at costa by a blackish patch. A row of black terminal lunate dots. Claviform concolorous, evidently outlined in black. Ordinary spots concolorous, black ringed; orbicular rounded, reniform kidney-shaped. Secondaries even, fuscous. Thorax, patagiæ concolorous, lined with blackish; collar rich dark brown; disc of thorax pale, contrasting reddish yellow. Abdomen yellowish gray. Beneath, powdery reddish fuscous, primaries with disc darker; both wings with a darker extra discal transverse line, and a large lunate discal spot.

Expands 35–40^{mm}; 1.40–1.60 inches.

HABITAT.—New York, Pennsylvania, New Jersey, Northern, Middle, and Eastern States, Canada.

The species is not rare, and is readily known by the prominent thoracic tufting, which is discolorous, yellowish.

In badly rubbed specimens there is sometimes doubt between this species and *perattenta*, but not when the specimens are in anything like decent condition.

Eueretagrotis perattenta Grt.

1874. Grt., Can. Ent., VI, 131, *Agrotis*.
1832. Grt., Ill. Essay, 51, pl. 1, f. 7, *Agrotis*.

"Color of *A. attentus*, but brighter, rosy brown and more like *triangulum*, on account of the discal field before the orbicular and between the spots being suffused with dark brown shading. Orbicular spherical pale; claviform indicated in outline; a deep brown shading accompanies the basal dash. Reniform large and wider than in *triangulum*. Ordinary lines distinct, geminate, dark brown; t. p. line with its inner line distinct, lunulate; its outer line lost against the darker brown subterminal space, which is differentiated by its deeper color and which it inwardly limits. Subterminal line indicated by the difference in color between the subterminal and terminal spaces, the latter concolorous with the rest of the wing. Hind wings pale testaceous fuscous in ♂, more fuscous in ♀. Beneath, a common fuscous line and dots; the tint is testaceous with fuscous powderings; fore wings the darker, with ruddy costal edge."

Expands 32–36^{mm}; 1.28–1.44 inches.

HABITAT.—Canada, Maine, Massachusetts, New York, New Jersey, and the Northern and Eastern United States.

Distinguished from *sigmoides* by the thoracic tufting which, while evident, is not discolorous, by the concolorous costa, the somewhat darker s. t. space as compared with the rest of the wing; the more evidently outcurved t. p. line and the more yellowish secondaries. It is not rare, but scarcely a common species. The genitalia have been already described.

Eueretagrotis attenta Grt.

1874. Grt., Can. Ent., VI. 131, *Agrotis.*

"* * * Fore wings pulverulent brown, paler over the costal region, on which the inception of the geminate lines are marked in dark brown. There is a narrow deep brown basal ray extending to the dentate indistinct t. a. line. Disc not suffused with darker brown between the ordinary spots which are moderate, pale, with fine dark annuli. Orbicular spherical, complete, not pointed inferiorly as in *triangulum.* T. p. line with its pale center alone perceivable, denticulated, notched opposite the cell. The subterminal space is not differentiated by any darker tint; the subterminal line is pale, preceded at costa by a very slightly darker brown shade, not always noticeable, and not at all like the determinate mark of *triangulum.* Male hind wings almost whitish; female darker. Thorax and head like fore wings. Beneath the fore wings are brown, with the exterior line indicated; hind wings with brown costal region, else pale, with faint discal spot and a double subterminal line marked on the costal region."

Expands 34–36^{mm}; 1.36–1.45 inches.

HABITAT.—Canada, New York, Maine; Northern and Eastern United States.

This is most nearly like *perattenta,* but lacks the black filling in of cell. The costal region is generally pale powdered, at least basally, and as a rule the species is lighter in color. No male has been under examination.

Genus ABAGROTIS Smith.

Anterior tibiæ not spinose; antennæ of male with joints marked, laterally furnished with bristly tufts; thorax with a distinct keel-like crest; front smooth; wings rather short and broad, subequal, very much as in *cupida;* palpi with second joint clavate, third joint minute, forming, with the frontal vestiture, a short snout.

This genus is very distinctly characterized, and is a peculiarly intermediate or synthetic form. In wing form, palpal structure, and general habitus the resemblance to *Rhynchagrotis* is marked. Unlike that genus the antennæ of the ♂ are "brush-like," very much as in *Carneades.* From the latter the smooth front will suffice to separate it, while from all other allied genera it is distinguished by the distinct, not divided, anterior crest. It has a casual resemblance to *Glæa* and allied forms, but is not depressed.

In genital structure there is a resemblance to *cupida*, which, combined with the habital resemblance to *cupidissima*, emphasizes the correctness of the present association.

Only a single species is so far known.

Abagrotis erratica Smith.

1890. Smith Trans. Am. Ent. Soc., XVII, 41, *Agrotis*.

General color, dull ashen gray to brick red, smooth and dense in appearance. Palpi dark at side. Head and thorax immaculate. Primaries very evenly clothed, the lines not much darker and not prominently relieved. Basal line indistinct geminate. T. a. line geminate, the lines very narrow, faint, outwardly oblique, not very much angulated. T. p. line rather regularly outcurved, geminate, inner line narrow, broken below vein 3; outer line punctiform. S. t. line pale, very slightly less so than ground color, relieved by a dusky preceding line, and a general dusky coloring of the terminal space, its course very slightly irregular. In the reddish forms the transverse lines are almost entirely obsolete. Claviform wanting. Ordinary spots evenly dark filled, with a narrow defining line; small in size. Orbicular slightly oval, oblique, reniform, rather narrow, upright, very slightly constricted. Secondaries glistening, smoky fuscous, somewhat paler basally. Beneath pale powdery fuscous, with a darker outer line and discal spot.

Expands 34–37^{mm}; 1.36–1.50 inches.

HABITAT.—Sierra Nevada, California (McGlashan), California (Neumoegen).

Types of this species are with Messrs. Edwards and Neumoegen, and also in the collection of the U. S. National Museum.

Genus SEMIOPHORA Steph.

Anterior tibiæ unarmed, front smooth; antennæ of male lengthily bipectinated.

The two species separated under the above term agree in the dark red brown color, the tendency to pale, discolorous ordinary spots, obsolescence of transverse lines, and in structural details generally. Yet withal they differ habitally to such an extent that their structural identity has been overlooked.

In *elimata* the wings are trigonate, broad and somewhat produced or at least rectangular at the apex. The vestiture consists of flattened hair forming no evident tufts.

In *catherina* the wings are proportionately narrower, the apex more obtuse. The vestiture is longer, more hairy, also forming no obvious tufts.

There is no particular agreement in the genital structure of the male, and as has been suggested no very strong character binds the species.

The differences between the two species have been already indicated. *Elimata* is the larger and is rather variable in appearance, and in details of maculation, leading to its redescription by both Messrs. Grote and Morrison.

The genus *Semiophora* is adopted on Mr. Butler's suggestion (Tr. Ent. Soc., Lond. 1889, 385) that the *elimata* of Guenée was referable to it.

Semiophora elimata Gn.

1852. Gn., Sp. Gen. Noct., I, 333, *Noctua*.
1856. Wlk., Cat. B. Mus., Noc., X, 400, *Graphiphora*.
1880. Grt., Bull. Surv., VI, 566.
badicollis Grt.
1873. Grt., Bull. Buff. Soc. Nat. Sci., I, 136, pl 4, f, 18 *Ammaconia*.
1875. Grt., Can. Ent., VII, pl. 1, f, 12, *Agrotis*.
1875. Morr., Proc., Ac. N. Sci., Phil., 27, 55, *Agrotis*.
dilucida Morr.
1875. Morr., Proc. Ac. N. Sci., Phil., 27, 55, *Agrotis*.
1878. Grt., Bull. Surv., IV, 170, *Agrotis*.
1879. Butl., Trans. Ent. Soc., Lond., 1879, 385, pr syn.
janualis Grt.
1878 Grt., Bull. Surv., IV. 169, *Agrotis*.

Mr. Grote's translation of Guenée's description is accurate, and is as follows: "Fore wings pale ashen, much mixed with pale violaceous red, all the lines visible of the former color, preceded and separated by shades of the latter tint, especially the subterminal line which is very sinuous and irregular; the t. p. line is denticulate; the t. a. line forms three large teeth, all marked on costa by a deep brown mark. The two stigmata well defined, pale, separated inferiorly by a dark line; the orbicular contiguous to the t. a. line; the reniform large and regular, the terminal space ashen. Hind wings of a uniform dark gray, with fringe paler and more reddish. Beneath the fore wings are reddish. Antennæ of the male strongly pectinate. Female larger but similar."

"Expands 40^{mm}."

This description very well characterizes the average of the forms of *badicollis* Grt., where the transverse lines are fairly complete. Mr. Morrison recognized the likeness of his species, *dilucida*, but considered it as distinct. A description drawn up from a large number of species is as follows:

Head, thorax, and primaries purplish brown, variably powdered with bluish gray scales, which are sometimes so dense that the color appears an even pale gray. Secondaries and abdomen pale dull fuscous, often reddish, especially in the *dilucida* form. Beneath, warm red brown, base and disc of primaries more fuscous.

Transverse lines tending to become obsolete, always, however, well marked on costa. T. a. line obliquely from costa over orbicular, then with an inward curve embracing half the orbicular, thence with two

outward sinuations to base. T. p. line very strongly crenulate; from costa over reniform, very oblique to the end of the cell, thence inwardly and evenly rounded to inner margin. S. t. line irregular, indefinite, consisting rather of a shade than a line, often defined in dark forms by the paler terminal space. The ordinary spots vary in size and in distinctness; often the reniform is discolorous gray or yellowish. Sometimes both spots are distinctly outlined in black, and occasionally the space between is darker, and the spots are inferiorly connected by a black line. Collar often paler, usually concolorous.

The ♂ harpes are rounded at the tip, and inferiorly a corneous claw-like projection is formed. The clasper is a single, long-curved, corneous hook.

Expands 38–45^{mm}; 1.42–1.80 inches.

HABITAT.—Maine to Georgia, Canada.

Rather a variable species, and the specimens yet so much alike that they are instantaneously recognized. Three of the varieties have been named as species. *Elimata* is smaller, usually paler, and has the ordinary spots distinctly outlined; it has usually also the collar rather paler, inclining to cinereous, though this is not constant; *dilucida* Morr. is larger, usually more reddish, the markings less distinct, often obsolete; *janualis* Grt. is like this, but the reniform is discolorous. Among the specimens labeled "types" by Mr. Morrison as many of the *janualis* as of the other form are found, and Mr. Morrison evidently considered the forms as identical. In this I agree with him. In the larger forms the collar is also often paler, varying from brighter red to cinereous.

Guenée describes the larva, after a drawing by Abbot, as having nearly the same colors as the moth, *i. e.*, the dorsal and subdorsal region reddish, the lateral ashen, without well-defined lines, and only showing some slightly darker subdorsal markings. Head ocher yellow. Collar dark brown. Feet concolorous. Pupa light red, with the membrane covering the wings mixed with greenish.

According to Abbot's figure, on Chrysanthemum.

Mr. Butler has, long since the above was written, positively referred *dilucida* to *elimata* as a synonym.

Semiophora catherina Grt.

1874. Grt., Can. Ent., VI, 116, *Matuta.*
1875. Grt., Buff. Bull., I, 124, *Matuta.*
1875. Grt., Can. Ent., VII, pl. 1 f. 7, *Matuta.*
1880. Grt., Can. Ent., XII, 187, *Agrotis.*
manifestolabes Morr.
1874. Morr., Pr. Bost. Soc. N. H., 17, 176 *Agrotis.*
1880. Grt., Can. Ent., XII, 187, pr. syn.

"Dark and deep red brown; the fore wings are brighter colored outside of the t. p. line, and at the base below the median vein. The median transverse lines are hardly to be made out against the blackish

red brown color of the wing; the t. p. line is seen to be single and regularly interspaceally scalloped and accented on the nervule. The stigmata contrast by their gray color; the orbicular well sized, spherical; the reniform proportionate and inclosing a blackish inferior stain as in allied genera. The subterminal line is quite distinct, being indicated by a line of powdery grayish scales like the stigmata. There is an extremely fine gray wavy terminal line *before* the margin, formed by the outer edging of the deeper tinted marginal line, which appears as interspaceal points. Fringes light brown, cut by a fine darker hair-line (preceded by a pale line) without the middle. Hind wings pale, much soiled with fuscous and with the pale ruddy fringes. Beneath fuscous, with a rufous tinge, both wings rather dark, with discal marks and a broad vague, common shade line. Thorax like fore wings; collar above with indistinct pale edging; palpal tips pale, as is the front, else the head is rufous."

Expands 32–34^{mm}; 1.28–1.36 inches.

HABITAT.—Canada, New Jersey, Northern and Eastern States.

The color is variable, often irrorate with gray, otherwise there does not seem much variation.

The male harpes are gradually attenuate and rounded at tip, the clasper is stout, strong, single, almost rectangularly bent, and very slightly curved. The species seems rare and has been recorded as taken only in early spring (May).

Genus PACHNOBIA Gn.

Front smooth, rather broad, full; anterior tibia spinose, somewhat more heavily armed at tip. The vestiture is distinctly and lengthily hairy, fine; in *salicarum* and *okakensis* forming perceptible divided anterior and posterior tufts, in the other species loose, divergent, or but indefinitely bunched into a basal tuft. The ♂ antennæ are variable, either simple, serrate or pectinate. The primaries also differ somewhat in form, and this affords a basis for subdivision. The ♂ genitalia are decidedly variable, in no two species exactly alike. From the other groups, with smooth front and spinose fore tibia, this group is distinguished by the long hairy vestiture and the more or less ferruginous color. The genus *Pachnobia*, as based on this group, is fairly well distinguished and should be accorded generic rank. Lederer says: Fore tibia unarmed, head retracted, bombyciform, habitus of *Tænicampa*, with a sharp crest behind collar. None of the species agree with this diagnosis, and whether the other species (except *carnea*), which Lederer places in the genus, agree with it or not is unknown to me. I retain the term, however, in the hope that it will prove available. The body is plump in *salicarum* and *okakensis*, but only moderately stout in the balance of the species. The majority of the species have the ♂ antenna strongly bipectinate.

These species are again divided according to wing shape; most of them having the costa straight or somewhat convex, the apices not produced.

Monochromatea is distinguished by the even, parallel transverse lines, the ordinary spots wanting. The type is a ♂, but in such condition that it is impossible to get at the genitalia without great risk of breakage.

Manifesta is similar, but the transverse lines are not parallel, their course normal; the ordinary spots present but as dark indefined macula. The ♂ genitalia almost precisely like the typical form in the *muræ nula* group.

Ferruginoides is somewhat paler in color, the veins darker marked, the ordinary maculation neatly defined; the ordinary spots concolorous. The genitalia are distinctive. The harpes are semi-corneous; the inferior margin thickened, tapering toward the tip, and terminating in a somewhat blunt point; the clasper arises from this lower rim, is long, corneous, and curved.

In the other species of the section the costa of primaries is depressed, somewhat more so just before apex, causing the latter to appear somewhat drawn out.

Salicarum, of which *claviformis* and *orilliana* are synonyms is distinguished by the very distinct velvety dark brown claviform. The ♂ harpes are rather narrow, corneous, the tip abrupt and irregular. The clasper is a simple short corneous hook similar to that in *manifesta*.

Okakensis differs from the preceding by the lack of claviform and by the discolorous gray terminal space. The ♂ genitalia are unknown to me.

Carnea has serrate ♂ antenna, thus differing at once from all the preceding species. The cell is always dark, relieving the usually concolorous ordinary spots; the t. a. line is oblique, even. *Cinerea* represents a form of this species suffused with gray, the transverse lines very distinct.

Wockei, of which *scropulana* is a synonym, differs from *carnea* in the form of the t. a. line which is very strongly dentate on costa and outwardly bent beneath internal vein. The ♂ antennæ are also entirely simple and ciliate merely. In the form of the genitalia they also differ. *Carnea* has no distinct clasper, but modified corneous harpes, curved, and at tip furcate, the tines unequal. *Wockei* has distinct broad harpes, and a clasper not unlike the side piece of *carnea*, the fork longer.

Alaskæ, said by Mr. Grote to resemble *carnea*, really belongs with his genus *Agrotophila*, and is an ally of *montana*. It is a very distinct species, easily recognized by the yellow claviform which crosses the entire median space. I have seen but one specimen, but recognized it immediately.

SYNOPSIS OF SPECIES.

Antenna ♂ distinctly bipectinate.
  Costa convex or straight; apices of primaries not produced.
    Rust red brown; ordinary spots obsolete; median lines broad, curved, parallel, single.....MONOCHROMATEA.
    More intermixed with gray; transverse lines not parallel; ordinary spots present, small, black, indefinite.....MANIFESTA.
    More luteous; transverse lines all narrow, distinct; ordinary spots large, concolorous, neatly outlined.....FERRUGINOIDES.
  Costa depressed, concave; apex of primaries produced.
    Claviform distinct, dark brown; s. t. line even, pale; terminal space darker, SALICARUM.
    Claviform obsolete; s. t. line uneven; terminal space pale, steel gray, OKAKENSIS.
Antenna ♂ serrate.
    Cell black between ordinary spots; claviform moderate; transverse lines usually indistinct.....CARNEA.
Antenna ♂ simple, ciliate.
    T. a. line angulate or dentate on costa, outwardly bent beneath vein 1..WOCKEI.

Pachnobia monochromatea Morr.

1874. Morr. Proc. Bost. Soc. N. H., 17, 165, *Agrotis.*

Ferrugineous, sprinkled with black atoms. Transverse lines simple, broad, subequal, parallel, approximate, evenly curved outwardly. S. t. line and ordinary spots obsolete. Secondaries paler, reddish fuscous. Beneath paler with ferruginous scales, an incomplete common dark line. Head and thorax concolorous.

Expands 31^{mm}; 1.25 inches.

HABITAT.—Massachusetts.

A single ♂, the type, examined. The insect is very easily recognized by the simple markings, and especially the parallel median lines. It must be rare, as I have never seen any other specimens and have heard of none taken.

Pachnobia manifesta Morr.

1870. Morr., Pr. Bost. Soc. N. H., 13, 116, *Agrotis.*

Red to ferruginous brown, more or less irrorate with black scales; the transverse lines single, dark, well defined. Basal lines distinct. T. a. line ♂ upright, thrice waved between veins, rather remote from base; ♀ much more even, oblique. T. p. line nearly parallel with outer margin. S. t. line forming the beginning of a slightly paler terminal shade; its course sinuate. Claviform obsolete; ordinary spots dark indefinite; orbicular punctiform; reniform ovate or somewhat lunate. Secondaries fuscous. Beneath fusco-ferruginous, powdery with a variably distinct common line. Head and thorax concolorous.

Expands 31–34^{mm}; 1.25–1.35 inches.

HABITAT.—Long Island, New York.

The types, ♂ and ♀ are before me. The difference between the sexes in the course and position of t. a. line is remarkable, so much so that did the same variation, in addition to the difference in ground color exist in individuals of the same sex, I should have little hesitation in declaring them specifically distinct. There is no other species, however, with which this could be easily confused, for none have the same combination of structural characters combined with the same general style of maculation. Mr. Morrison says the orbicular is sometimes absent, but the presence of the basal and course of the transverse lines will prevent its confusion with the preceding.

Pachnobia ferruginoides Smith, sp. nov.

Rather reddish yellow, hardly ferruginous, veins marked with darker brown. Transverse lines single; t. a. line decidedly oblique outwardly, curved between veins; t. p. line very evenly curved throughout its course. S. t. line marked by a preceding darker shade, its course even, somewhat less oblique than outer margin. A distinct broad rather even transverse shade crosses the median space over reniform. Claviform faintly outlined. Ordinary spots distinctly outlined; orbicular large, slightly ovate concolorous; reniform narrow, kidney-shaped, somewhat darkened by the median shade. Secondaries dark; blackish fuscous, fringes pale. Beneath powdered with rusty red, a variably distinct common line and discal spot also ferruginous.

Expands 33–35^{mm}; 1.30–1.40 inches.

HABITAT.—Montana, "Black Hills."

In the ♂ the maculation is less distinct than in the ♀. In the latter sex also there are some elongate scales intermixed in the thoracic vestiture, which are entirely wanting in the ♂. The species is very distinct from anything heretofore described, and seems in some way to have missed description by me in 1887, when the form was first characterized; how this happened I can not at present say, as I have no opportunity of again examining my type.

Pachnobia salicarum Wlk.

1857. Wlk., C. B. Mus. Het., XI, 717, *Hydræcia.*
1882. Grt., Ill., Essay, 42, *Pachnobia.*
orilliana Grt.
1875. Grt., Can. Ent., VII, 154, *Pachnobia.*
1875. Grt., Can. Ent., VII, 227, pl. 1, f. 8 = *claviformis.*
1882. Grt., Ill. Essay, 42, pr. syn.
claviformis Morr.
1874. Morr., Pr. Bost. Soc. N. H., 17, 162, *Agrotis.*
1875. Morr., Pr. Bost. Soc. N. H., 18, 115, *Agrotis.*
1880. Grt., Bull. Bkln. Ent. Soc., III, 36 = *orilliana.*
1882. Grt., Ill. Essay, 42 = *salicarum.*

Prevailing color red or rust brown, ground color with a yellow tinge. Basal line simple, fine. T. a. line obsoletely geminate, outer portion

only distinct, fine, distinctly marked on costa, its course evenly oblique. The inferior outer portion of basal space is darker. T. p. line geminate, included space of pale ground color; its course sinuate, widely bent over cell, evenly incurved beneath. S. t. line broad pale, very even. Outer portion of s. t. space shaded with pale ground color, else beyond t. p. line darker red brown. Orbicular round, moderate, concolorous; reniform normal, well sized, somewhat obscured by the broad transverse brown shade which occupies the outer third of median space. Claviform very distinct velvety deep brown, forming at once the most striking characteristic of the species. Secondaries reddish fuscous. Beneath pale, strongly powdered with rust red; a common outer line and discal spot. Thorax concolorous. Head and collar dashed with gray.

Expands 33–34^{mm}; 1.32–1.36 inches.

HABITAT.—Massachusetts, Maine, White Mountains, and northward; Canada; Hudson Bay territory.

One of the most easily recognizable of the species. There is nothing to conflict with the remarkable deep brown claviform, which forms the most salient feature of the maculation.

Pachnobia okakensis Pack.

1867. Pack., Pr. Bost. Soc. N. H., 11, 38, *Agrotis*.
1875. Morr., Psyche, I, 40, *Agrotis*.

Rather pale rust red; terminal space steel gray; from the basal space along the costa to t. p. line sprinkled with gray. Transverse lines single, brown; t. a. line interrupted, upright or slightly oblique; t. p. line sinuate, distinct; s. t. line marked by the contrasting gray terminal space; twice outwardly dentate, then sinuate. Ordinary spots large, irregular, completely pale ringed. Claviform wanting. Secondaries brownish gray with a fuscous discal spot. Beneath powdered reddish gray with discal spot on each wing.

Expands 34^{mm}; 1.35 inches.

HABITAT.—Labrador, Mount Washington.

The type is in the Peabody Museum at Salem, and is badly eaten. The head and prothorax are entirely gone, and the body is a mere shell.

The wings were (June, 1884) still in good condition. The insect is easily recognized by the gray terminal space and the irregular, pale ringed ordinary spots. The above description was made from the type and I have never seen another specimen.

Now in Cambridge at the Museum of Comparative Zoology.

Pachnobia carnea Thunb.

1788. Thunb., Mus. Nat. Ac. Ups. Diss., 72, f. 1.
1816. Hubn., Verz., 222, *Diarsia*.
1852. Guen., Spec. Gen. Noct., I, 342, *Pachnobia*.
1860. Moeschl., Wien. Ent. Monatschr., IV, 163, *Pachnobia*.

1856. Wlk., C. B. Mus., Hest., X, 415, *Pachnobia.*
1875. Grt., Psyche, I, 77, 100, *Agrotis.*
Ab. CINEREA Stgr.
1861. Stgr., Stett. Ent. Zeit., XXII, 369, *Pachnobia.*

Rust red to deep-red brown; cell between ordinary spots darker to blackish. Lines often more or less obsolete; when present broad, single, even. T. a. line unusually remote from base, evenly oblique outwardly; t. p. line very near to outer margin, somewhat denticulate, its course sinuate; s. t. line indicated only by the boundary of the slightly paler terminal space. Claviform represented by a blackish mark representing some portion of an outline, never complete. Orbicular concolorous, set into the dark shading of cell, open superiorly. Reniform moderate, of normal shape, variably complete. Secondaries reddish fuscous; beneath reddish powdery, with a variably distinct common line and discal dot. Head and thorax concolorous.

Expands 32–34^{mm}; 1.30–1.35 inches.

HABITAT.—Labrador, Lapland; circumpolar.

A variable species, in which the transverse lines are usually obsolete and only the markings in the cell are visible. The aberration *cinera* is suffused with a bluish-gray tint, and the transverse lines are distinct.

Pachnobia wockei Moeschl.

1862. Moeschl., Wien. Ent. Monatschr., VI, 130, pl. 1, f. 1, 2, *Agrotis.*
1883. Moeschl., Stett. Ent. Zeit., 44, 117 (occurs in Asia?).
scropulana Morr.
1874. Morr., Pr. Bost. Soc. Nat. Hist., 17, 165, *Agrotis.*
1875. Morr., Psyche, I, 42, *Agrotis.*
1875. Grt., Psyche, I, 77=*carnea.*
1875. Morr., Psyche, I, 85, an sp. dist.
1875. Grt., Psyche, I, 100=*carnea.*
1885. Smith, Ent. Amer., I, 14=*wockei.*
1885. Smith, Stett. Ent. Zeit., 46, 223=*wockei.*

Rust or red-brown, basal and terminal space paler, grayish, cell darker, blackish; basal line distinct, black, followed by a gray shade, and terminating in an irregular basal dark patch. T. a. line preceded by a gray shade, a distinct acute outward tooth on subcostal vein, variable in length, then rather evenly oblique outwardly to vein one, beneath which there is an outward curve of variable length; t. p. line rather even, crenulate, parallel with outer margin; s. t. line paler, iregularly sinuate, at costa marked inwardly by a large brown patch. Claviform pale, outlined in black, very variable in length; ordinary spots paler gray or concolorous. Orbicular variable, usually open above, sometimes V-shaped, the lower angle rounded and varying to the typical form of *scropulana* where it is complete. Reniform upright, somewhat constricted at middle. Secondaries fuscous; beneath essentially as in the preceding species; collar inferiorly yellowish, tipped with brown.

Expands 31–37^{mm}; 1.25–1.50 inches.

HABITAT.—Mount Washington, Labrador.

To the courtesy of Mr. Moeschler I owe an opportunity of comparing his type of *wockei* with the type of *scropulana*, received from Mr. Tepper. They are unquestionably specifically identical, though the types are apparently the extremes of the species. Other specimens from New Hampshire fill the gap completely. Mr. Grote was entirely in error in referring *scropulana* to *carnea*, and seems never to have been able to realize the distinction between them, though he himself pointed out one of the strong characters offered by the course of the basal line. The antennal differences in the male are obvious, and should not have escaped notice. Mr. Moeschler's species seems to have escaped recognition heretofore, and it is due to a liberal scientific spirit on the part of that author in sending me the specimens that I have been able to study his species.

Genus SETAGROTIS Smith.

All the tibiæ spinose, anterior not very heavily armed, and scarcely abbreviated. Front smooth, not protuberant. Antennæ with the joints marked, laterally furnished with tufts of bristly hair, resembling those of *Carneades*, but scarcely so well developed. The vestiture consists of flattened hair and scales, forming on the thorax an indefinite, anterior divided crest. The palpi are short, the second joint very broad at tip, terminal joint minute, resembling very much the structure in *cupida*.

In antennal structure this genus tends to the *Carneades* series, and furnishes another of the links connecting the extremes like *Carneades* and *Rhynchagrotis*. It resembles the latter much less than does *Abagrotis*, adding to the characters of the latter, spinose fore tibiæ and a different wing form.

Two species, *planifrons* and *congrua*, are referable here, agreeing in general type of maculation, yet easily distinguishable by a large series of characters, the most obvious of which are the black tipped collar and black basal dash in *planifrons*, while in *congrua* the collar is reddish tipped, and there is no basal dash.

Setagrotis planifrons Smith.

1890. Smith, Trans. Am. Ent. Soc., XVII, 42, *Agrotis*.

General color a bluish ash-gray; sides of palpi blackish; collar black tipped; thorax immaculate. Primaries with a distinct vinous red shade through the lower half of the wing, less marked in the basal and terminal spaces. Basal line single, black, strongly dentate, running to the basal dash. T. a. line single, broader on costa and internal margin, strongly dentate between veins, slightly oblique outwardly. T. p. line broad, distinct, crenulate, outwardly curved over reniform, and inwardly sinuate below, the curves very even and not strong. A broad, diffuse median shade crosses the reniform, then runs parallel

and rather close to t. p. line, darkening the median space beyond, to the t. p. line. S. t. space becoming gradually darker to the s. t. line, which is defined and limited only by the contrast of this dark shade against the concolorous terminal space. A row of black terminal lunules. A black longitudinal dash at base extending to t. a. line. Claviform wanting. Orbicular concolorous, black ringed, elongate, the ends drawn out, the one reaching the t. a. line, the other to the reniform, which is narrow, lunate, incompletely defined, darkened by the transverse median shade. Secondaries white, veins a trifle soiled, and with a dirty indefinitely marked outer border. Beneath, primaries fuscous, powdery, pale costally where the outer transverse line is visible; secondaries paler, more powdery, with outer line marked across costal space only; a distinct discal spot.

Expands 34^{mm}; 1.36 inches.

HABITAT.—Northwest British Columbia.

A very handsome species, of which I have seen only a single specimen from Mr. Neumoegen's collection.

Setagrotis congrua Smith.

1889. Smith, Trans. Am. Ent. Soc., XVII, 43, *Agrotis*.

Ashen gray, palpi dark at the sides; collar with a narrow, dark, transverse line, above which is a series of white scales, the tip of collar marked with a reddish, almost ferruginous shade. Thorax immaculate. Primaries with a somewhat ferruginous shade extending through the middle of the wing into the s. t. space and tinting that space nearly its full length; veins somewhat dark marked. Basal line marked on costa only. T. a. line single, marked by a distinct costal spot, from which the line is traceable through the cell, twice dentate in this course, then not again visible, except as a curved mark below the internal vein. T. p. line traceable for its entire length, single, not prominent, rather even, with little outward spurs on the veins. S. t. line indefinite, paler, interrupted, marked by the slight contrast between terminal and s. t. space created by the rusty tinging of the latter. A row of dusky terminal lunules; no basal dash, no claviform. Orbicular elongate, black ringed, connected with the reniform by a short spur line; reniform incomplete, indefinite, the inner outline only defined. Secondaries whitish, glistening, with the veins dusky and with a faint discal lunule. Beneath whitish, powdery, with a diffuse outer line on each wing visible only across the costal region.

Expands 33^{mm}; 1.36 inches.

HABITAT.—Oregon.

A single male in good condition is before me. The species agrees perfectly with *planifrons* in the generic characters, and is closely allied to that species in general type of maculation. There are so many differential characters, however, that there is not the slightest danger of confusing them.

Genus AGROTIS Tr.

Anterior tibiæ spinose, the tibiæ not abbreviated, spines moderate. Front smooth, antennæ of ♂ bipectinate or lengthily serrate and bristled. Vestiture moderately close, no distinct thoracic tuft; primaries variable in shape. In the form of the ♂ genitalia *ypsilon* and *geniculata* agree; *badinodes* differs very decidedly, while the ♂ of *violaris* I have been unable to examine.

The species of this group, agreeing as they do in structural characters, are yet totally dissimilar in general appearance and in the details of ornamentation. The species are therefore easily recognized. *Badinodes* is at once known by the brown color, and very even, pale transverse lines. The collar is also deep brown. The antennæ of ♂ are evenly bipectinate, the anterior tibia sparsely spined, and the accessory cell of primaries often open outwardly. The ♂ harpes are broad, rather short, somewhat spoon-shaped, rounded outwardly, with an acute tooth at middle of tip. The clasper is long, corneous, and curved. *Violaris* is somewhat similar to the preceding in ornamentation, but the color is bluish gray, with outer half of median space dark, reniform outlined in yellow. The primaries are narrower, but otherwise the habitus of the insect refers it here. I have not been able to examine the ♂ genitalia. *Ypsilon* is peculiar. The habitus would seem to refer it to *Saucia* and allies, but the front is distinctly smooth. The species can be recognized by the dark ground color, pale s. t. space, and a distinct saggitate black dash from middle of outer side of reniform, meeting or closely approaching similar dashes, marking two strong dentations of the s. t. line. The antennæ of the ♂ are lengthily pectinate on the upper side only, the pectinations on the outer side being short, acute. The ♂ genitalia are very close to those of the *muraenula* type, consisting of the long broad harpes, obliquely terminated at tip and furnished with spinules; the clasper is short, beak-like, corneous. The tibiæ are rather broader and more heavily spinose than in the preceding species. It is closely allied structurally to *segetum*, and seems rather to belong to a European type of structure, for with its tibial armature and genitalia the front ought to be roughened or tuberculate. *Geniculata* agrees with *ypsilon* in the sexual and tibial armature, but differs not only in wing form and ornamentation but also in having the antennæ rather serrate and bristled than pectinate. This insect also agrees in structural details with the *muraenula* group, but the front is decidedly smooth and the ornamentation entirely different. The color is dark ash gray, darker beyond t. p. line; space between the ordinary spots black.

Assuming *segetum* as the type of the genus *Agrotis*, the foregoing are the only species structurally identical with the European forms. The combination of characters is definite and easily limits the series. The small number of species agreeing with the European type is remarkable, and not less striking is the dissimilarity of the species associated

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...outer half of median space, fuscous.
VIOLARIS.

...lengthily pectinated; a saggitate dash from
.....YPSILON.
...antennæ shortly pectinate and bristled; stigmata
.....GENICULATA.

Agrotis badinodes Grt.

1873. Grt., Bull. Buff. Soc., vi, 13, *Agrotis.*

...primaries red brown; collar, deep blackish brown; s. t. ...median shade, and space between the ordinary spots ...basal and t. a. line even, narrow, darker brown; a distinct black ...line at the median vein, marking the lower edge of orbicular. ...evenly and slightly convex outwardly; darker brown, narrow, ...by a distinct pale shade which gives the characteristic appear- ...the insect. The ordinary spots are large and faintly outlined; ...faintly indicated by a black dot at outer end; s. t. line con- ...or but slightly paler, irregular, marked by the difference in ...between the s. t. and terminal space. Secondaries fuscous, with a ...shade; beneath powdered with reddish with a distinct black- ...extra discal line and discal lunule.

Expands 35–39^{mm}, 1.40–1.56 inches.

Habitat.—Maryland, New York, Canada, eastern and northern United States.

The species is common and easily distinguished. The primaries are wide and comparatively short. The color, maculation, and pectinate antennæ form a combination so peculiar that the species is easily recognized. No life history of the species has been written.

Agrotis violaris G. and R.

1868. Grt. and Rob., Tr. Am. Ent. Soc., I, 353, pl. 7, f. 59, ♂, *Agrotis.*

Ground color gray, irrorate with fuscous brown, outer half of median space also fuscous; s. t. space more densely mixed with dark scales than the other pale portions of wing. Basal line indistinct, t. a. line distinct, rather broad, slightly angulate on costa and internal vein, else straight. T. p. line of ground color, margined each side with the dark shading of median and s. t. space; its course slightly convex outwardly, most evidently so opposite the cell. S. t. line with three outward angulations, defined by the contrast between the somewhat darker s. t. and concolorous terminal space. The orbicular is small, faintly outlined with dark scales; reniform elongate, slightly constricted

in the middle, narrowly annulate with yellow. Secondaries fuscous, beneath paler, with the same maculation as in *badinodes*.

Expands 37 ^{mm}, 1.5 inches.

HABITAT.—Pennsylvania, Middle States.

Rather a rare species, but easily recognized. The primaries are narrower than in the preceding species but the general style of maculation is identical. Unfortunately I have had no good ♂ under examination. The type is a ♂, but the antennæ are gone; the description says they are serrate, the serratures diminishing toward the tip; the genitalia of the specimen appear to be missing in part, but from what remains the clasper appears to have been bifid. The front closely examined shows a barely traceable protuberance; it is not unlikely therefore that fresh and abundant material will necessitate the removal of this species to another group or genus.

Agrotis ypsilon Rott.

1776. Rott., Naturf., 41, 141, *Noctua*.
1816. Hüb., Verzeichniss, 225, *Exarnis*.
1883. Saund., Fruit Insects, 327, f. 338, *Agrotis*.
1889. Butler, Trans. Ent. Soc. Lond., 1889, 380, *Peridroma*.
suffusa S. V.
1852. Gn., Noct. I, 268.
1857. Wlk., C. B. Mus., Lep. X, 309, *Agrotis*.
telifera Harr.
1841. Harris, Rept. Ins. Mass., *Agrotis*.
1842. Harris, Inj. Insects, 323, *Agrotis*.
1864. Grt., Pr. Ent. Soc. Phil. III, 95 pr. syn.
1868. Riley, Rept. Ins. Mo. I, 80, 28 pl. 1, f. 8–10, *Agrotis*.
1881. Riley, Index and Supplt. to Mo. Repts. 55 pr. syn.
idonea Cram.
1782. Cram., Exot., III, 150, 275, f. H. *Phalaena*.
1852. Gn., Noct. I, 269, pr. var.
1857. Wlk., C. B. Mus., Lep. X, 309, pr. syn.

Ground color deep, dark purplish brown, variably suffused by a rather pale luteous shade, s. t. space pale luteous to apex, and even in dark specimens the inferior portion of basal space at least is pale. Basal line obsolete. T. a. line geminate, not very evidently defined, inwardly oblique in course, but outwardly curved between veins, a long outward curve below vein 1. T. p. line indistinctly geminate, punctiform, its course very even. S. t. line close to outer margin, very strongly dentate, the dentations marked by preceding sagittate points very obvious and black opposite the cell. The dentations are longest on veins three and four. Claviform small, outlined in black. Orbicular moderate or small, concolorous, variable in shape, narrowly outlined in black. Reniform kidney-shaped, of good size, concolorous, outwardly marked by a distinct black sagittate dash, sometimes reaching the similar dashes from the s. t. line. Secondaries dusky, with a pearly luster. Beneath, the wings are uniformly colored, the primaries black-

ish, no discal line; secondaries with a variably distinct discal spot. Collar with two narrow black lines.

Expands 37–53mm, 1.50–2.12 inches.

HABITAT—United States and Canada.

One of the most common and well-known species. It is readily distinguished from all the others by the long and narrow wings, as well as the difference in color. The pale s. t. space and the black sagittate dashes from reniform and before the s. t. line give the species a characteristic appearance impossible to be mistaken and unlike any other American species. The type to which this belongs is European, as has been already suggested.

The life history has been frequently written in the works of the economic entomologists. The larva is a general feeder and has been injurious to strawberries among others.

I am entirely unable to understand Mr. Butler's synonymy of this species. He makes *saucia* Hbn. the same as *ypsilon* Rott., and cites *differens*, *ambrosioides*, *impacta* and *intecta* Walker also as synonyms. Then he adds that a specimen labeled *turris* in Mr. Grote's collection is the same as the *impacta* of Walker, and thus destroys the possibility of crediting any part of his synonymy. *Saucia* has simple antennæ, *turris* has them serrate and bristled, while *ypsilon* has them pectinated!

Agrotis geniculata G. & R.

1868. Grt. and Rob., Tr. Am. Ent. Soc. I, 349 pl. 7, f. 54, *Agrotis*

Varying from dark ash-gray to deep fuscous or smoky; basal and transverse lines geminate; included space pale; s. t. line very irregular, narrow, pale; ordinary spots pale; intervening space black; an indistinct median shade; claviform short, narrowly outlined in black; s. t. space usually darkest, median space usually palest; t. a. line irregularly dentate and scalloped; t. p. line very irregular; variable in position and course, but usually with a single evident outward curve. Secondaries fuscous brown to smoky black, paler toward base. Beneath dull dark smoky, paler toward base of wing. Collar with a distinct black line.

Expands 33mm, 1.32 inches.

HABITAT.—Northern, Eastern, and Middle States.

This insect is so variable in color and maculation, while retaining a remarkable uniformity of appearance, that a detailed description is rather that of an individual than the species. As a rule the space beyond the t. p. line is darkest, the gray predominating in the other parts of the wing. The dark space between the ordinary spots continued as a median shade adds to the peculiarity of the species and renders it easily known. From the other species of the group it has been sufficiently distinguished.

It seems not common, and its early stages are not published.

Agrotis bollii Grt.

1883. Grt. Bull. U. S. Geol. Surv., VI, 160, *Agrotis.*
hilaris Grt.
1880. Grt. Can. Ent. XII, 153, *Agrotis.*

"♂ Concolorous, silky, blackish gray, with a sprinkling of pale scales. Antennæ rather lengthily bipectinate. Head, collar, and thorax concolorous, collar a little darker tipped; palpi darker at the sides. Only the two median lines visible; these are even, pale, the inner line oblique, the outer somewhat bent, nearly straight, not inflected. A black spot on the cell against the inner line, and a second quadrate, larger at the middle. These spots follow and precede the orbicular, which with the reniform is concolorous with the wing and difficult to make out. The orbicular is V-shaped, open above; the reniform small, upright, medially constricted; both spots indistinctly pale ringed; a small spot on the line indicates the claviform. Median lines slightly marked with black on costa. Fringes concolorous. Hind wings blackish, paler at base; fringes pale, interlined. Beneath both wings blackish, with pale irrorations; a common extra medial shade line. Expanse 34^{mm}; Texas."

Compared to *collaris* and *badinodis;* but evidently very close to *geniculata*, and possibly a suffused form of that species. Southern specimens of *geniculata* tend to become more evenly colored, and in a specimen before me the orbicular is distinctly V-shaped. Still the form described is very distinct from anything I have thus far seen.

Agrotis quarta Grt.

1883. Grt., Bull. Geol. Surv. VI, 258, *Agrotis.*

"♀. Fore tibia unarmed; rosy brown, resembling *baja.* Lines brown, badly marked; t. p. line broken into dots; subterminal line subcontinuous, nearly straight. Orbicular round, nearly concolorous, with a bright stain edging the fine incomplete annulus within. Reniform reddish orange, contrasting, upright, with incomplete brown annulus, shaded with ochrey. Beneath paler, shaded with rosy, with discal marks and exterior irregular common line. Collar brighter than the rosy brown head and thorax. Expanse 40^{mm}. Sauzalito, California."

Seems a good species allied to *badinodis;* but entirely unknown to me. It can not be referred to the *baja* group, nor, in fact, properly to this, if, as stated, the fore tibiæ are unarmed. No ♂ seems known, but probably the antenna will be found to be pectinated. The vestiture is not described and possibly the relationship may be more nearly with the *carnea* group. The color agrees with the species of that group. It is impossible to do much with a description like the above until a specimen precisely fitting it comes to hand.

Genus PERIDROMA Hbn.

Common to the species united under this term are the following characters: All the tibiæ spinose, fore tibiæ rather heavily armed but scarcely abbreviated; front smooth; thoracic vestiture consisting of mixed scales and hair; antennæ of male simple, or ciliate merely; primaries regularly widening outwardly, apex produced or rectangular, not rounded. Two groups are united under this term, separable as follows:

Thorax with distinctly divided anterior and posterior crests, primaries quite evidently produced at apex .....Group SAUCIA.
Thoracic tufts not divided, apex of primaries not so distinct .....Group INCIVIS.

Saucia may be considered the type of this genus, which contains a not too diverse assemblage of species, more particularly characterized in the remarks under the group headings. The assemblage is related rather to the Old World species, but in the *incivis* group a closer approach to the more peculiarly western forms is noticeable.

Group SAUCIA.

This group is characterized by spinose fore tibia, smooth front, simple or merely ciliate male antennæ and distinctly crested thorax. The crest is usually distinct, extending the full length of thorax, and evidently divided; rather more prominently so anteriorly. The primaries are moderately large, the apices acute, somewhat extended, outer margin oblique. Except *rudens* and *pellucidalis*, the species are well sized and have a robust appearance peculiarly their own. The normal noctuidous markings are traceable in all species, but often the transverse lines are more or less indefinite or indistinct. The ♂ genitalia vary greatly, and agree only in that the clasper is single, simple, and curved. The harpes are very different in shape, but afford no bases for grouping the species.

The species are not difficult to distinguish. *Occulta*, *præfixa*, *astricta*, and *grandipennis* are large species, with the thoracic tufting least marked. The three first named had been placed in the genus *Eurois*, but I fail to discover any character which allies these species with *pressa* and *prasina*, save the size and a general agreement in wing form.

Occulta is easily distinguished by its large size, the ashy gray primaries, and blackish secondaries. At first glance it is not unlike *Acronycta* in appearance, but the resemblance is superficial merely. The genitalia of the ♂ are characteristic. The clasper is long, curved, corneous, nearly as long as the harpe, dilated at the base, and slightly so toward the tip. The harpes are long, semi-corneous, the tip straightly cut, the upper angle only slightly prominent. *Præfixa* is smaller, but resembles *occulta* in the color and general maculation of the primaries. The secondaries are, however, pale fuscous, instead of black. A single ♀ only has come under my notice. *Astricta* is nearly,

if not quite, equal in size to *occulta*, and with practically the same markings; the ground color of the primaries, however, is red brown, and the secondaries are fuscous brown. The ♂ genitalia have been examined in only a single specimen, and that but superficially with a lens. From such examination they appear much like those of *occulta*. *Grandipennis*, though expanding scarcely more than *saucia*, is somewhat wider winged, and is referable at once to the large species. The color is an even yellowish brown, the costa marked with a yellowish tinge, maculation faint. The secondaries are very pale yellowish. The ♂ type from Mr. Neumœgen's collection was the only specimen examined, and could not, of course, be dissected or broken to examine the genitalia. From outward examination the harpes are almost evenly oblong, a small superior projection similar to that of *occulta* from the tip. The clasper was invisible.

The remaining, smaller species, in which the thoracic cresting is most marked, are also easily distinguished. *Saucia* is so common and so universally known that no special characterization seems needed. *Unica* is distinguished by the pale ground color and very distinct transverse lines. The ♂ genitalia are very distinctive, the harpes are long, concave, somewhat dilated, and ladle-shaped toward the tip; a row of spines project inwardly at tip. The clasper is short, corneous, acute, and but slightly bent. The variety agrees perfectly with the species in this respect. The remaining species, *rudens* and *pellucidalis*, agree in having iridescent, white secondaries and creamy, or somewhat purplish gray primaries; they are also perceptibly smaller than either of the other species. *Inter se* they differ in that *rudens* has a black basal dash and a black connecting line between the ordinary spots, both of which are wanting in *pellucidalis*. The ♂ genitalia are practically identical. The harpes are moderately broad, suddenly and deeply emarginate near tip on lower edge, giving the terminal portion a bent ladle appearance. Inwardly at tip there is a row of short acute spines. The clasper is rather short, corneous, acute, and but slightly curved.

SYNOPSIS OF SPECIES.

Size large, thoracic, tuftings not prominent.
  Primaries gray.
    Secondaries blackish, size larger ..... OCCULTA.
    Secondaries fuscous, size smaller ..... PRÆFIXA.
  Primaries red brown.
    Ordinary spots large; transverse maculation distinct ..... ASTRICTA.
    Ordinary spots small; transverse maculation obsolete ..... GRANDIPENNIS.
Size smaller, thoracic tuftings very distinct.
  Color yellowish to blackish.
    Transverse lines usually punctiform, indistinct, ordinary spots obscured by darker atoms, all maculation obscure ..... SAUCIA.
  Color creamy or purplish gray.
    Primaries with a black basal dash and a black connecting line between the ordinary spots ..... RUDENS.
    Primaries without basal dash or connecting line ..... PELLUCIDALIS.

Peridroma occulta Linn.

1767. Linn., Syst. Nat., IV, 514, *Noctua.*
1816. Hübn., Verzeichniss, 218, *Eurois.*
1852. Guen., Noct., II, 76, *Aplecta.*
1874. Grt., Can. Ent., VI, 13, 70, *Eurois.*
1876. Speyer, Stett Ent. Zeit., XXXVI, 204, *Aplecta.*

Ground color rather dark ash gray; irrorate with smoky brown; maculation smoky to black. Transverse lines moderately distinct, faintly geminate, basal line scarcely evident, a slightly darker indefinite basal shade. T. a. line lunulate, moderately even, outer line most distinct. T. p. line outwardly bent over cell, thence obliquely inward to hind margin. Inner line lunulate, almost crenulate, outer line even absorbed by a dusky shade reaching half way to the s. t. line. S. t. line slightly sinuate, well-defined by a series of rather large, black sagittate spots. A row of black terminal dots. Through the median space is an indefinite dark shade, most evident between the ordinary spots on claviform. Claviform outlined; moderate in size; ordinary spots large, concolorous or paler; orbicular rounded, incompletely closed above; reniform kidney shaped. Secondaries blackish, fringes clear white. Beneath, uniform smoky gray. Head and thorax like primaries; abdomen darker, smoky.

Expands 50–53^{mm}; 2–2.12 inches.

HABITAT.—Northern and Eastern States, Canada.

Easily distinguished by its large size and pale color. It seems not uncommon, though never taken in large numbers. *Implicata* Lef. (Ann. Soc., Ent. Fr. v, 394 pl. 10 f. 4, *Hadena*) cited as synonymous or varietal to this species I consider distinct, though nearly allied. As I can not find authentic record of the species as American, it is here omitted.

Peridroma præfixa Morr.

1875. Morr., Proc. Bost. Soc. N. H., XVIII, 117, *Agrotis.*

Ash gray, maculation smoky or black, somewhat sparsely irrorate with blackish. Basal line distinct, geminate; a small, dark, basal patch. T. a. line sinuate; evenly oblique outwardly. T. p. line distinctly geminate only at inception, crenulate, nearly parallel in course with outer margin. S. t. line pale, relieved by the distinct smoky s. t. shade and by a more indefinite outer shade not reaching either margin. A lunate dark terminal line. A faint, rather narrow, median shade; space between ordinary spots, dusky. Claviform very distinctly and broadly outlined; ordinary spots, large, concolorous, or paler. Orbicular, rather oblique, oblong, open above; reniform upright, kidney shaped but rather narrow, and with an unusually straight inner line. Secondaries rather pale, fuscous, darker outwardly. Beneath gray, irrorate, with fuscous brown; primaries, with somewhat paler terminal shade; secondaries, with darker extra discal shade and discal lunule.

Expands 42mm; 1.68 inches.

HABITAT.—Rocky Mountains.

Very readily distinguished from the preceding, not only by the size and the color of secondaries, but by the broad, dark, inward shading to the s. t. line, which is characteristic of this species. The single ♀ specimen seen is from the collection of Mr. J. Meyer.

Peridroma astricta Morr.

1874. Morr., Proc. Bost. Soc. N. H., XVII, 135, *Eurois.*

Red brown; basal, s. t., and terminal spaces darker. Transverse lines geminate, though not very distinct. Basal line scarcely obvious. T. a. line evenly and slightly oblique. T. p. line evenly curved over the cell, thence parallel with outer margin. S. t. line irregularly dentate, marked by the contrast between s. t. and terminal spaces, the former being darkest, the latter nearer to ground color. Claviform indefinitely outlined, of good size. Ordinary spots large, rather more grayish than ground color, distinctly, though narrowly, outlined in black. Orbicular oblique, oblong; reniform upright, slightly constricted at center. Secondaries dull smoky brown; beneath powdery, with darker common shade line and discal lunule. Thorax very dark brown; abdomen like secondaries.

Expands 50–53mm, 2–2.12 inches.

HABITAT.—New York, New Hampshire, and Northern States; Canada apparently not common. Easily known by the large size and brown color.

Peridroma grandipennis Grt.

1883. Grt., Ann. and Mag. N. H., 1883, 54, *Agrotis.*
1884. Grt., Trans. Kans. Ac. Sc., VIII, 54, *Agrotis* (reprint).

Rich, purplish red brown, veins marked incompletely with black, terminal black marks distinct. T. a. line blackish, faintly geminate, dentate, a long outward submedian tooth. Other transverse lines obsolete or only marked on costa. Orbicular small, round, pale, with a dark central dot. Reniform small, indefinite, pale, centered with ground color. A slightly darker dash connects the two spots. Secondaries pale fuscous, veins marked. Thorax like primaries in color; abdomen shaded with reddish; beneath pale whitish, with darker common line and discal lunule, most evident on secondaries.

Expands 45–52mm, 1.80–2.08 inches.

HABITAT.—New Mexico.

I have seen but a single ♂, from Mr. Neumoegen's collection, and could not make out the genital structure without risk to the specimen. I think they will be found to resemble those of *occulta* quite strongly.

The species seems rare, and rather local.

Peridroma saucia Hubn.

1816. Hbn., Samml Eur. Schmett, Noct., 378, *Noctua.*
1816. Hbn., Verzeichniss, 227, *Peridroma.*
1852. Gn., Noct., I, 271, *Agrotis.*
1856. Wlk., C. B. Mus. Lep., X, 311, *Agrotis.*
1873. Grt., Bull. Buff. Soc. N. Sci., I, 135, *Agrotis.*
1883. Saunders, Fruit Insects, 106, pp. 100–103, *Agrotis.*
inermis Harris.
1841. Harris, Rept. Ins. Mass., *Agrotis.*
1842. Harris, Injur. Ins., 323, *Agrotis.*
1869. Riley, 1st Rept. Ins. Mo., 72, pl. I, ff. 1–4, *Agrotis.*
1873. Packard, Our Common Ins., 199, p. 240, *Agrotis.*
1873. Grt., Bull. Buff. Soc. N. Sci., I, 135, pr. syn.
1876. Riley, 8th Rept. Ins. Mo., 37, pp. 24, 25, *Agrotis.*
1881. Riley, Index & Suppl. to Mo. Report, 55, pr. syn.
ortonii Pack.
1869. Pack, 1st Rept. Peab. Ac. Sci., 63, *Argotis.*
1874. Morr., Proc. Bost. Soc. N. H., 17, 210, pr. syn.
Var *margaritosa* Haw.
1810. Haw., Lepid. Britt, 157.
1852. Guen., Noct., I, 271, pr. syn.

Yellowish fuscous to purplish brown, more or less irrorate or suffused with black, the maculation often entirely obscured. T. a. line geminate, lunate, upright. T. p. line single, crenulate, often only punctate, sometimes obsolete, rarely very distinct; evenly curved over the cell. S. t. line indefinite, marked only by the somewhat darker shade of terminal space; a row of lunate terminal spots. Ordinary spots large, concolorous; orbicular round or oval; reniform short and rather broad; claviform short, faintly outlined; secondaries iridescent whitish, outwardly smoky, veins marked. Beneath powdery, somewhat iridescent, with a common dark outer line or shade. Expands 40–50^{mm}, 1.60–2.00 inches.

HABITAT.—North and South America, Europe, Asia.

This is one of those obscure forms so difficult to describe, the ornamentation consisting of shadings rather than markings, and scarcely two specimens appearing entirely alike. It is, however, so different from all the species associated with it that there is no danger of mistaking it for other than itself.

The term *margaritosa* applies to the nearly uniformly luteous specimens, rare in the United States, while I have somewhere named a very distinctly marked specimen without any confusing shades *unica*. The term is not sanctioned by description, and I now deem the form not sufficiently constant to require a name.

The life history has been well written by Professor Riley, and the species has been frequently treated in economic publications.

Peridroma rudens Harv.

1874. Harvey, Bull. Buff. Soc. N. Sc., II, 271, *Agrotis.*

Creamy gray, somewhat darker at base, and more or less irrorate with black scales. Transverse lines obsolete. Ordinary spots small, neatly cut, concolorous or centered, with few dark scales. A distinct black basal dash, and a broad dash connecting the ordinary spots, also black. A brownish subapical costal spot, followed by a paler apical spot. Secondaries pearly white with a narrow, dark terminal line. Beneath, pearly white; primaries powdered with black, as is the anterior margin of secondaries. Head and inferior half of collar creamy yellow. Thorax and collar dark, somewhat purplish gray.

Expands 31–33^{mm}; 1.25–1.32 inches.

HABITAT.—Texas. Apparently a common species in Texas, and very readily recognized by the pale colors and the neat, contrasting black maculation.

Agrotis pellucidalis Grt.

1880. Grt. Bull. Geol. Surv., VI, 567, *Agrotis.*
rudens ‡ Harv.
1875. Harvey, Bull. Buff. Soc. N. Sc., III, 5, *Agrotis.*

Very like *rudens* in color and general maculation, but lacking entirely the black basal dash and the connecting line between the ordinary spots. The geminate transverse lines are traceable, the t. p. usually punctiform, and the claviform spot is faintly outlined. In other respects there is no perceptible difference from *rudens.*

Expanse and locality as in *rudens*, and it seems equally common.

Group INCIVIS.

All the tibiæ spinose; anterior moderate in length, not broadening toward the tip; spines long, slender, straight, and weak. Front broad, full, slightly narrowing inferiorly, not roughened or tuberculate. Eyes large. Antennæ simple in both sexes; ciliate in the ♂. Thoracic vestiture smooth, appressed; in perfect specimens showing a small divided basal tuft, most evident in *incivis.* The primaries are rather small, smoothly scaled, with a more or less evident satiny lustre, the apex always distinct.

The harpes of the ♂ are long, rather narrow, the tips slightly enlarged, somewhat concave, the apex oblique or rounded, inwardly fringed with a row of acute spines. The clasper is simple, moderate in length and but slightly curved.

The species are few in number and easily separated. All are pale in color. *Incivis* is largest, the color carneous gray, the ordinary spots distinct, brown, and of good size; the s. t. line is distinct, but the others are either obsolete, or indicated by black venular points. The other species are more whitish, the transverse maculation entirely wanting,

and only the reniform marked by an indefinite black patch. *Tenuescens* is irrorate, with reddish-brown scales, and the secondaries are dusky. *Simplaria* and *digna* are white, the secondaries also pale; the latter has a black line crossing the collar, a feature wanting in *simplaria*.

In tabular form the species may be arranged as follows:

Primaries carneous gray, maculate with dark-brown transverse striga. Ordinary spots usually distinct and large ..... INCIVIS.
Primaries whitish, irrorate with reddish, reniform indefinite, black .... TENUESCENS.
Primaries whitish, more or less irrorate with black scales.
Collar concolorous, median vein relieved by dark scales, terminal space darker, SIMPLARIA.
Collar with a distinct black line; primaries less irrorate with black ..... DIGNA.

Peridroma incivis Gn.

1852. Guen., Noct., I, 274, *Agrotis*.
1856. Wlk., C. B. Mus., Lep., X, 331, *Agrotis*.
1874. Grt., Bull. Buff. Soc. N. Sc., II, 303, *Agrotis*.
1874. Morr., Proc. Bost. Soc. N. H., XVII, 164, *Agrotis*.
1880. French Can., Ent., XII, 14 (larva sub. nom. *lubricans*.)
1882. French Can., Ent., XIV, 240, *Agrotis*.
alabamæ Grt.
1874. Grt., Bull. Buff. Soc. N. Sc., 159, *Anicla*.
1875. Grt., Can. Ent. VII, 102.
infecta Ochs.
1816. Ochs., Nachtr., 6, 8, *Agrotis*.
1816. Hübner, Verzeichniss, 220, *Hapalia*.
præcox ‡ Hbn.
1816. Hbn., Samml Eur. Schmett, Noct., 359, *Noctua*.
1816. Hbn., Verzeichniss, 220 = *infecta*.
1856. Wlk., C. B. Mus., Lep., X, 331 = *incivis*.

Ground color of thorax and primaries varying from dark ash to a somewhat reddish gray. Primaries irrorate with blackish scales, and dark, narrow, transverse striga. As a rule, the ♀ is paler than the ♂. T. a. line obsolete or barely traceable. Claviform rarely outlined in brown, usually obsolete. Orbicular often wanting; when present annulate with brown and white, center blackish. Reniform distinct, large, black, annulate with white, and ferruginous. T. p. line usually traceable by black venular points; slightly sinuate, and nearly parallel to outer margin; when completely defined the line is denticulate. S. t. line defined by an inward ferruginous shade, and the red brown terminal space. Secondaries white, semi-transparent, anterior and outer margins dusky, blackish. Beneath primaries even, ash gray, secondaries as on upper side. Palpi black at sides, terminal joint minute. Collar with a broad, dark brown fascia.

Expands 32–38^{mm}; 1.28–1.52 inches.

HABITAT.—District of Columbia to Florida, Mississippi, Illinois, Texas, California.

This species has a distinct though small basal thoracic tuft, and is also distinguished from all its allies by the obviously defined, ordinary

spots. The male specimens are usually darker and more fully marked than the females.

The synonomy relating to *infecta* and *præcox* is from Walker, and has not been verified by me. I consider it very questionable in correctness, and do not give *infecta* priority for that reason.

The species is not rare, and the larva has been described by Prof. G. H. French.

Peridroma tenuescens Smith (Morr. MSS.).

Head and thorax whitish, with a few scattered reddish and black scales. Primaries whitish, suffused outwardly with reddish; maculation obsolete, only the black indefinite reniform being traceable. Secondaries grayish or smoky, paler at base. Beneath uniform pale gray, powdered with blackish.

Expands 31^{mm}; 1.25 inches.

HABITAT.—Nebraska.

A single specimen in Mr. Tepper's collection has the above MSS. name of Mr. Morrison attached. It is sufficiently distinct from its allies to render separation easy. I have never seen another specimen.

Peridroma simplaria Morr.

1874. Morr., Proc. Bost. Soc. N. H., XVII, 164, *Agrotis* (*simplicius*).
1875. Morr., Proc. Bost. Soc. N. H., XVII, 210, *Agrotis* (*simplaria*).
1875. Harv., Bull. Buff. Soc. N. Sc., III, 5, *Agrotis* (*simplicia*).
1880. Grt., Bull. Geol. Surv., VI, 108, *Agrotis*.

Pale ash gray. Primaries sparsely sprinkled with black scales; terminal space darker, blackish, sometimes concolorous. Transverse lines obsolete; in dark specimens the s. t. line is traceable through the dark terminal portion. Claviform usually outlined by black scales. Median vein marked with black scales. Reniform blackish, indefinite, sometimes formed by two superimposed black spots. Secondaries snowy white, a few dusky scales along anterior margin. Beneath, primaries gray, inner margin paler; secondaries as above.

Expands 28–31^{mm}; 1.12–1.25 inches.

HABITAT.—Texas.

Readily recognized by the general habitus, and seems not uncommon in Texas.

Peridroma digna Morr.

1875. Morr., Proc. Bost. Soc. N. H., XVIII, 115, *Agrotis*.
nigrovittata Grt.
1875. Grt., Bull. Buff. Soc. Nat. Sc., III, 77, *Agrotis*.

White; primaries irrorate with a few black scales, sometimes forming a slightly darker terminal field. Claviform sometimes faintly indicated, but usually entirely wanting. Reniform usually consisting of

two black dots. Collar, lower half black, else white. Secondaries snowy white. Beneath clear white, irrorate with a few gray scales.

Expands 31–33^{mm}; 1.25–1.32 inches.

HABITAT.—Texas.

Close to *simplaria*, but evidently distinct by the black lined collar, and the more even pale color. I have seen Mr. Morrison's type, and typical specimens of Mr. Grote's species, and despite Mr. Grote's statement that "this can not be Mr. Morrison's *digna*," the two species are unquestionably identical. Mr. Morrison's type was a fully marked but somewhat faded specimen, while Mr. Grote's material was fresh, but as a whole more lightly marked.

Genus NOCTUA Linn.

In using the term *Noctua* for the present assemblage of species, I am guided by Guenée's selection, rather than by the result of personal investigation. Linné's original genus has been so subdivided that the very term *Noctua* has been left without a meaning, at least I am not aware that it is now used in a generic sense for any series of species. To some series the term must be applied, and as the breaking up of the *Agrotes* offered the opportunity, I follow M. Guenée in selecting a series here as typical. Two Linnæan *Noctua* are in the *Normaniana* group, while the European representatives of the same type have several others.

As compared with the preceding, *Noctua* has spinose fore tibiæ; the armature not very heavy; the front is smooth, flat; the antennæ in the male simply ciliate; vestiture hairy, scaly, or mixed; primaries with apices rectangular or rounded; the wings rather broad or subparallel, narrow.

It is allied to *Peridroma* in most of these characters, differing in the wing form, as shown in the table.

Two series or groups, based upon the difference in structure of palpi and in general style of maculation.

Group *Normaniana* has the second joint of the palpi clavate at tip, and the ordinary transverse maculation and spots distinct, while in group *Clandestina* the palpi are equal, and the maculation tends to become obsolete or strigose. The species often have a peculiar sordid depressed or flattened appearance, which is somewhat characteristic.

Group NORMANIANA.

Front full, somewhat bulging; anterior tibia spinose, but not heavily armed at tip; the member moderate in length. Antennæ of ♂ simple, pubescent, or slightly serrate, the joints set with fine bristles. *Normaniana* has a long bristle at each side of each joint. Thorax untufted, or with low fore and aft tufts only; never a divided crest; somewhat depressed in the majority of the species. Primaries moderately long, in

the larger part of the species rather obtuse, the apices rounded. The palpi have the second joint always clavate at tip. The normal noctuidous maculation is usually distinct; in a majority of the species the cell between ordinary spots is darker than other portions of the wing, and in none are the spots entirely obsolete, nor is the maculation at any time strigose.

The ♂ genitalia are alike only in two species, and they are so strongly distinct in other points that the resemblance seems casual merely. As a whole the species of this group are less related among themselves than those of almost any other group. A decided feature is the character of the harpes. In other groups these usually show only an unimportant amount of variation; but here, on the contrary, the most unexpected range of variation is found.

The divisions of the group, structural characters not serving, are based on maculation.

Two divisions of similar extent are obtained by separating the species, in which the s. t. line is marked at costa with a dark spot or patch.

The division so distinguished is subdivided according to the shape of primaries. These are in the first instance obtuse, rounded at tip; in the second, the apex is at least rectangular and usually somewhat produced.

In the first subgroup the species are:

Baja, which is well known and common to Europe and the United States. In color it varies from luteous to bright red brown. Characteristic are the very distinct black spots initiating the s. t. line, and forming the only contrast to the otherwise nearly uniform coloration. The ♂ genitalia are distinctive. The harpes are long and broad, apparently formed by the junction of two pieces longitudinally. The superior portion of this combined piece is longer, separately rounded at tip. The inferior portion, also rounded at tip, is excavated or emarginate at the side, the margin somewhat irregular: at the line of junction of these pieces and not far from tip, is a long, curved, acute, corneous hook. At the base of the harpes is a semi ovate raised corneous rim, from the upper margin of which proceeds a short, somewhat circular projection.

Normaniana is narrower winged, paler, yellowish gray in color, the ordinary spots small, the cell between black, thus at once distinguished by its color; it is also distinct by the bristled antenna of ♂, above described. The genitalia are also distinctive. The harpes are long, moderately wide, oblique at tip, from the lower margin projecting a long finger, corneous in consistency. Just behind this finger the side piece becomes suddenly broader, and gives rise to an oblique corneous projection enlarged at tip. This forms the clasper.

Bicarnea is distinct in all respects. Of a deep blackish brown color, the primaries are marked with a distinct reddish brown patch at base, and a smaller, similar patch at costa over t. p. line. The antennæ are simple. The ♂ genitalia are striking. The harpes taper gradually to

the tip where they are abruptly truncate, the angles a little prominent and round. Near the base of this piece is a corneous ridge from which arises a broad hatchet-shaped piece slightly concave at underside.

With *bicarnea* ends the section with apices of primaries rounded. The remaining species of the first division have the apices at least rectangular and usually somewhat produced. *C-nigrum* is a very well known species common to both continents, distinguished by the dark primaries, and the open V-shaped orbicular, which is reddish. The thorax has distinct but low anterior and posterior tufts. The ♂ genitalia consist of broad harpes, the tip of which is oblique, the inferior angle somewhat elongated, the inner side of tip spinulated. The inferior extension of the tip is corneous, and imitates an oblique corneous ridge extending to upper margin and there produced into a short projecting spur.

Hospitalis is well defined from the preceding by the reddish-brown color. The ♀ only is thus far known.

Perconflua is closely allied in maculation, but is a broader winged species, with primaries more evidently trigonate, the apices less produced. Of this species also, I have seen no ♂.

With this species ends the first division: the remainder of the species are divided by color and maculation.

Phyllophora is a large broad-winged species, bright red brown in color, the maculation well defined, the lines irregular. The thorax is rather indistinctly tufted, the basal tuft evident. The ♂ genitalia are decidedly peculiar. The harpes are corneous, incurved around the tip, forming a cavity under the rim, partially covered by an irregular horny plate. A reference to the figure will explain better than words. It is certainly the most remarkable structure known to me in any *agrotid*.

Rubifera is a smaller, shorter winged species, darker, more sordid brown in color, with very regular transverse lines, and hardly contrasting maculation. The genitalia are of a somewhat more normal type. The harpes are broad at base, very abruptly strangulate near tip, the latter oblique, inwardly spinulate, with a bunch of diverging spines at inferior angle. The clasper is distinct, bifurcate, the inferior fork long, stout, regularly tapering to an acute tip. The superior branch is shorter, stouter, curved, also acute at tip.

Oblata, of which *hilliana* is a synonym, is a bright species more yellowish in color, with contrasting, well-defined maculation. The orbicular is large, oblique, and open superiorly. The thorax is distinctly tufted. The ♂ antennæ has something of the moniliform type. The joints fringed laterally by stiff, short hair. The genitalia are distinctive. The harpes are rounded at tip, furnished with a finger-like projection at inferior margin behind which the piece suddenly widens and becomes somewhat corneous, the widened portion gradually merged

into an oblique corneous ridge, from which proceeds a trigonate acute projection.

Rosaria is a small species with narrow primaries. It is very even in color, varying in the shade of yellowish brown, the veins usually darker: the maculation is very indistinct and only the ordinary spots are sometimes yellowish. No ♂ is thus far known.

Rava is aberrant for this or any other group, but the balance of character refers it here. The ♂ antennæ are much as in *oblata*, somewhat moniliform. The color is of a sordid luteous gray, the lines imperfectly marked. The ♂ genitalia are not unlike *bicarnea*, but the harpe narrows more toward tip where it forms a small acute hook. *Umbrata* Pack. is a synonym of this species, as I ascertained by examination of Mr. Packard's type.

Fennica is of a different type from the preceding. The color is dark, blackish, ordinary spots contrasting yellowish, as is also the hind margin in the ♂. The primaries are long and unusally narrow. The ♂ parts are of a type not uncommon in the genus. The clasper consists of a single, subequal curved corneous hook. The harpes are broad, rather abruptly narrowed before, and obliquely rounded at tip.

Plecta is a small species, bright carmine or deep brown red in color, the costa whitish or yellow, the ordinary spots small, pale ringed. It is a very bright, easily recognizable form with genitalia like *fennica* in all essential points.

Collaris is a well-marked species; the head superiorly and the collar are deep purplish black; the primaries are dark; the transverse lines pale and very even; cell between the spots black. The ♂ genitalia are distinctive. The harpes are corneous, narrowed to tip, where they are furnished with a short spur projecting rectangularly; on the inferior margin, which is irregular, is another short and slightly curved acute projection.

SYNOPSIS OF SPECIES.

Black or dark spots or shade on costa, marking inception of s. t. line.
  Apices of primaries rounded.
    Color luteous to red brown; cell between ordinary spots not black, the latter large ..... BAJA.
    Color grayish yellow; cell between ordinary spots black, the latter small, NORMANIANA.
    Color blackish; superior portion of basal space and a large indefinite costal patch over t. p. line, reddish ..... BICARNEA.
  Apices of primaries rectangular or somewhat produced.
    Color dark; orbicular open; V-shaped discolorous and reddish ..... C-NIGRUM.
    Color red brown; orbicular complete.
      Primaries elongate; t. p. line distinct ..... HOSPITALIS.
      Primaries shorter, trigonate; t.p. line indistinct, often punctiform. PERCONFLUA.
No dark costal spots or patch initiating s. t. line.
  Collar concolorous or paler.
    Color yellow to red brown.
      Size large; color bright red brown; t. p. line irregular; orbicular small, pale, round ..... PHYLLOPHORA.

Size smaller; color darker, sordid; t. p. line very even, regular; orbicular large, concolorous, irregular, complete ..... RUBIFERA.

Color bright, more yellow; t. p. line irregular; orbicular oblong, oblique, open superiorly ..... OBLATA.

Color even, yellowish brown, veins darker, ordinary spots complete; size small, wings narrower ..... ROSARIA.

Color sordid gray; lines and spots faintly marked; vestiture unusually hairy, RAVA.

Color blackish; ordinary spots yellowish, contrasting; internal margin in the ♂ pale; primaries narrow, elongate ..... FENNICA.

Color bright carmine or lake to red brown; costa pale, whitish; ordinary spots small, annulate with white; a dash from base through discal cell black; size small ..... PLECTA.

Collar dark purplish black; lines very even pale; cell between ordinary spots black ..... COLLARIS.

Noctua baja. Fabr.

1787. Fabr., Mant. Ins., II, 175, *Noctua.*
1791. Oliv., Enc. Meth., VIII, 345, *Noctua.*
1793. Fabr., Ent. Syst., III, 2, 709, *Noctua.*
1793. Gmel., Ed. Linn., Syst. Nat., 2579, *Noctua.*
1816. Hüb., Verzeichniss, 222, *Amathes.*
1834. Hüb., Lep. Eur., Noct. IV, pl. 25, f. 119, *Noctua.*
1852. Gn., Sp. Gen., Noct. I, *Noctua.*
1856. Wlk., C. B. Mus., Lep. X, 396, *Graphiphora.*
1875. Speyer, Stett. Ent. Zeit., XXXVI, 122, *Agrotis.*
1876. Grote, Bull, Buff. Soc. N. H., III, 80, *Agrotis.*

Luteous to red brown. Transverse lines all evident, little darker than ground color. The costal spots at inception of s. t. line only, black or blackish. Transverse lines geminate. Basal half line distinct. T. a. line, slightly and evenly convex outwardly. T. p. line very even, sinuate, curve over cell very slight. The outer line is marked with darker venular dots. S. t. line narrow, distinct, very even, parallel to outer margin. Ordinary spots large, concolorous defined by a narrow pale annulus and the slightly darker filling of cell. Reniform slightly constricted at middle, inferiorly shaded with blackish. Claviform very short, illy and usually incompletely defined. Secondaries from pale luteous to dark smoky fuscous. Beneath, powdered with reddish; a common dark extradiscal line and lunate discal spot. Thorax and head concolorous with primaries; abdomen with secondaries.

Expands 36–40^{mm}; 1.44–1.60 inches.

HABITAT.—Europe and United States.

A wide-winged species with rather long and very slightly waved fringes. Easily distinguished by the reddish color and the prominent costal spots at inception of s. t. line; these are usually, black and in the great majority of specimens the darkest part of the wing.

A very remarkable amount of variation is found in this species. Lederer says the anterior tibiæ are not spinose. In all the American specimens examined spines are distinctly present, though in some cases well hidden by the vestiture. I have been unable to examine European

specimens, so I can not be certain whether we have not here as in the case of *triangulum* and *normaniana*, distinct species. On the whole, I am inclined to believe Lederer in error, because many specimens casually examined with a lens merely, appear unarmed. As to the amount of variation, that of ground color is remarkable; eastern material is more or less irrorate with red. Western specimens tend to become much more evenly colored, the color a shade of luteous. The primaries are narrower, more equal, and the secondaries have the fringes longer; the palpi are held like those of the *cupida* group, and were it not for the fact that sufficient material is at hand to prove the identity of the eastern and western forms, I might have placed some of the latter into the *cupida* group with a new name, overlooking the inconspicuous spinulation of the fore tibia. A specimen from the Rocky Mountains, received from Mr. Moeschler, would be almost infallibly placed in the *cupida* group without close examination. Mr. Moeschler indeed, whose knowledge of the *Noctuidæ* is certainly considerable, entirely failed to recognize its identity.

It is to be noted here that Speyer, in comparing the specimens of both Continents, speaks of this variability, but comes to the conclusion that they are specifically identical. However, he says also that the anterior tibiæ of specimens from both continents are unarmed.

The species is not rare, but is usually more common northwardly. *Atropos belladonna* has been recorded as a food plant of the species.

Noctua normaniana Grt.

1874. Grt., Trans. Am. Ent. Soc., v, 89, *Agrotis*.
triangulum ‡ Auct.
1852. Gn., Noct., i, 331, *Noctua*.
1856. Wlk., C. B. Mus. Lep., x, 390, *Graphiphora*.
1868. Beth., Can. Ent., i, 86, *Graphiphora*.
1874. Grt., Trans. Am. Ent. Soc., v, 89, pr. syn.
obtusa Speyer.
1875. Speyer, Stett. Ent. Zeit., xxxvi, 124, *Agrotis*.

Yellowish gray with a more or less evident rosy tint. Cell, except ordinary spots, black, costal spot at inception of s. t. line also black, very distinct. Maculation else fuscous. Basal line evident, t. a. line geminate, outwardly oblique, but little sinuate; t. p. line geminate, very even, upright, incurved only over cell; the inner line rather narrow, somewhat lunate; outer wider and very even; a row of venular dots just beyond outer line. S. t. line paler, well marked, sinuate, preceded by a brown shade and a few small black dots. An even somewhat diffused dusky shade crosses the median space. Claviform faintly indicated. Ordinary spots concolorous, seldom entirely complete; orbicular irregularly oval, oblique, open superiorly. Reniform narrow, lunate usually incomplete inferiorly. Secondaries smoky fuscous. Beneath powdered with blackish, a marked common line and discal lunule. Head and thorax concolorous with primaries.

Expands 35–39^{mm}; 1.40–1.56 inches.

HABITAT.—Northern and eastern United States, Canada.

This species has been very generally confounded with the European *triangulum*, from which it is nevertheless perfectly distinct. Mr. Grote in describing the species, Dr. Speyer in describing *obtusa*, and afterward Dr. Zeller pointed out the differences in ornamentation, which, however, are not greater than the variation observed in allied species. Mr. Grote found a structural character in the antennæ which have a stout bristle on each side of each joint, beside the usual ciliæ. In addition the genitalia of the ♂ show evident differences; they are so nearly of the same type that community of descent is demonstrated, but the inferior finger on the harpes is in *triangulum* reduced to a mere acute spur, and there is no accessory piece furnishing the base of clasper and exceeding the harpe. On the contrary, the clasper arises from the thickened, corneous margin of the harpe and is of almost identically the same shape as *normaniana*.

The peculiar yellow gray color, and the contrasting black cell furnish well-marked characters to separate the species.

Lederer says of *triangulum* "shienen unbedornt." Speyer says this is error, but the spines are very short and indistinct. In our species they are very evident.

Noctua esurialis Grt.

1881. Grt., Can. Ent. XIII, 131, *Agrotis*.

"This species has all the tibiæ spinose. In color it is like *peroonflua*, being of a pale ruddy brown over ochery. The stigmata are concolorous, and, as in *Normaniana*, set in a black spot. The orbicular nearly touches the reniform inferiorly, leaving a blackish brown V-shaped space between the stigmata. The orbicular is open to costa, oblique, widening above, preceded by a narrow black shade on the cell. Reniform widening inferiorly, constricted, upright. Lines dark; t. a. line single, marked on costa above the orbicular, sinuate, incomplete. T. p. line indicated by venular dots, as also the s. t. line, which is followed by a faint narrow pale shade and is inaugurated on costa by a curved mark. The species seems to belong to the series of *rubifera*, *peroonflua*, *Hilliana*, *conchis*, *Normaniana*. Hind wings pale fuscous, with the fringes and outer edge colored like primaries. Head a little paler than thorax, with the palpi darker at the sides. Abdomen, at the sides and beneath, tinged with rosy brown. Wings beneath tinged with ruddy, especially on the margins and outside of the extra mesial fuscous line. Discal marks indicated."

Expanse 31^{mm}.

HABITAT—Washington. Collected by H. K. Morrison.

Evidently allied to *Normaniana*, but smaller and of a somewhat different color. I have nothing that I could refer to this species in any of the collections studied by me.

Noctua bicarnea Gn.

1852. Gn., Sp. Gen. Noct., I, 328, *Noctua.*
1856. Wlk., C. B. Mus., X, 400, *Graphiphora.*
1889. Butler, Trans. Ent. Soc., Lond., 1889, 383, *Amathes.*
plagiata Wlk.
1865. Wlk., C. B. Mus., Lep. Het. XXXII, 664, *Mamestra.*
1882. Grt., Ill., Essay 44, pr. syn.
1889. Butl., Trans. Ent. Soc., Lond., 1889, 383, pr. syn.

Smoky black, superior part of basal space and a large irregular and ill-defined costal patch over t. p. line carneous or rather pale red brown; ordinary spots with a similar tinge and narrow annuli of same color. Cell of a deeper black. Lines geminate, basal line distinct; t. a. line twice outwardly curved, oblique; t. p. line rather even, illy defined parallel with outer margin; s. t. line pale, punctiform or lunate, very regular; claviform wanting; reniform rather narrow, somewhat irregular, elongate; orbicular narrow, oblique, oblong. Secondaries smoky fuscous. Beneath smoky, with a blackish common line; secondaries paler toward base, powdery, discal lunule present. Collar brown, thorax mixed with red brown.

Expands 37–41^{mm}; 1.5–1.65 inches.

HABITAT—United States, east of the Rocky Mountains.

A very well marked species, easily recognizable by the dark color and the contrasting red brown blotches. The primaries are unusually obtuse.

The initial black patches of s. t. line are, owing to the dark ground color of wing, rather less distinct than usual, but yet always evident.

Noctua treatii Grt.

1875 Grt., Can. Ent. VII, 186, *Agrotis.*

"♂. Allied to *A. bicarnea* Gn., smaller and distinguishable by the evenness of the t. p. line. Fore wings dead brownish black. T. a. line rigidly oblique to submedian fold, not rounded as in its ally, and with a less prominent tooth on internal margin. A very faint yellowish shading to the line and also on the costa at the inception of t. p. line, where *A. bicarnea* is strongly marked with carneous. T. p. line shaped as in its ally, but even, geminate, the inner line not scalloped; the component lines include a pale shading. Disc velvety black between the narrow stigmata, which are concolorous with the dead black of the wing. A black shade at base below the median vein. All the transverse lines geminate; the inner of the basal and t. p., and the outer line of the t. a., marked with velvety black. In one specimen there is an absence of the velvety black shades; this one is in imperfect condition and allows of no certain description. Hind wings yellowish gray, paler than in *bicarnea*, with a noticeable terminal darker shading. Beneath with common line and strong lunule on secondaries. Head dark brown on vertex, with pale marginal lines; terminal palpal joints pale; collar brown, with a

black and pale line at base. Legs dark, pale dotted. Thorax brownish black, with pale line at base of tegulæ. Abdomen like secondaries."

Expanse 34mm; 1.36 inches.

HABITAT—Massachusetts.

A very close ally of *bicarnea*.

I have seen only a single specimen, which fully agrees with the above description, and this is now in the coll. U. S. N. Mus. It is much larger than given by Mr. Grote, expanding fully 40mm. There is no locality label, and I have no idea where the specimen came from. It is easily known by its resemblance to *bicarnea*, but lacking the carneous shade.

Noctua conchis Grt.

1879 Grt., N. Am. Ent. I, 43 *Agrotis*.
1880 Grt., Trans. Kans. Ac. N. Sci. VII, 66, *Agrotis*.
1882 Grt., Ill. Essay, 51, pl. 1, f. 8, *Agrotis*.

"All the tibiæ spinose. Allied to *C-nigrum;* recalls *Hilliana* by the brightness of the ocher stigmata. Fore wings bright lilac gray, smooth, with a blackish tone. Base ocher, bounded by the half line. Orbicular light ocher, open to the costa, outwardly oblique. Reniform upright, wide at base, with a deep ocher interior ring. Median lines wide apart. Exterior line evenly scalloped, followed by points. Subterminal space darker, with blackish costal shade. Subterminal line followed by a pale shade line. Terminal space like s. t., gray at apices. Disc between and about the stigmata clouded with rich blackish brown. Claviform indicated. Median shade apparent below reniform. Head and collar bright ocher; tegulæ brownish ocher; dorsum very pale dusty ocher. Hind wings with a pale ochery ground, shaded with fuscous. Beneath, pale, with common continued scalloped line and discal lunule open on primaries. Abdomen light brownish ocher; breast light brownish; palpi dark brown at sides. Expanse 40mm."

HABITAT—Colorado.

A fair representation of this species is in the Illustrated Essay, showing it to be related to *bicarnea*, from which it differs in the discolorous orbicular, and the want of the brown patch at inception of t. p. line. I have not seen it in nature.

Noctua c-nigrum Linn.

1758. Linn., Syst. Nat. Ed. X, 516, *Noctua*.
1767. Linn., Syst. Nat. Ed. XII, 852, *Noctua*.
1816. Hbn., Verzeichniss, 223, *Megasema*.
1852. Gn., Noct., I, 328, *Noctua*.
1856. Wlk., C. B. Mus. Lep., X, 389, *Graphiphora*.
1883. Edw., Papilio, III, 133, *Agrotis*.

Smoky fuscous with a red brown shade; basal and terminal space darker; cell blackish; costa between median lines carneous or pale red brown. Basal line single, black, very distinct, terminating in a rather indefinite black patch. T. a. line obsoletely geminate, even, oblique.

T. p. line often entirely obsolete, usually consisting of a double row of venular points. S. t. line pale, often punctiform, best marked by the slight contrast between terminal and s. t. space; the black spots on costa distinct. Claviform faintly indicated, concolorous. Orbicular open superiorly, V-shaped, pale red brown. Reniform kidney-shaped, outlined in black, the inferior portion dusky, superior portion with a reddish shade. Secondaries smoky, paler toward base. Beneath smoky, secondaries paler, powdery, a common line distinct only on costa of both wings. Thorax concolorous; collar testaceous. Thorax with a low anterior and posterior divided tuft.

Expands 40–44^{mm}; 1.60–1.75 inches.

HABITAT.—Europe and North America.

It seems unnecessary to detail the characters of this well-known species: the broad pallid open orbicular contrasting with the otherwise rather dark primaries sufficiently distinguishes it. The European specimens are, as a rule, much paler and more distinctly marked than American examples, else there is no great difference.

The apices of primaries are more distinct than in the preceding species. The life history of the species has been frequently written.

Noctua hospitalis Grt.

1882. Grt., Can. Ent., XIV, 184, *Agrotis*.
1886. Grt., Can. Ent., XVIII, 220=*perconflua*.

Red brown. Basal line distinct, single, darker brown. T. a. line faintly geminate, outer line distinct, blackish, slightly irregular, outwardly oblique. T. p. line geminate, outwardly curved over cell, then parallel with outer margin; outer line punctiform, the dark venular points accompanied by pale dots. S. t. line pale, narrow, very slightly sinuate; dark costal shade at inception, distinct, brown. The median space is slightly darker brown than the rest of the wing and is crossed by an indefinite blackish shade line at outer third. Ordinary spots well sized; orbicular round, annulate with yellowish scales, concolorous. Reniform kidney-shaped, outlined by a narrow, yellow annulus, inferiorly darker, else concolorous. Claviform very faintly indicated. Secondaries smoky yellowish. Beneath smoky, powdered with red along margins; a common extra discal dark line. Secondaries with a discal lunule. Thorax concolorous; head paler with a yellowish tinge.

Expands 37^{mm}; 1.5 inches.

HABITAT.—New York.

A single ♀ specimen, the type, is in Mr. Hill's collection. It is closely allied to the European *brunnea*, but is perfectly distinct from any American species structurally allied to it. From *perconflua* to which Mr. Grote seems inclined to refer it, it differs at once in wing form. The primaries are more elongate and with more distinctly produced apices than in *perconflua*.

Noctua perconflua, Grt.

1876. Grt., Ann. Lyc. Nat. Hist. N. Y., XI, 304, *Agrotis. conflua* ‡ Grt.
1874. Grt., 6 Rept. Peab. Ac. 25, *Agrotis.*
1874. Grt., Can. Ent., VI, 71, *Agrotis.*
1889. Butler, Trans. Ent. Soc. London, 1889, 382=*Graphiphora jucunda*, Wlk.

Pale red brown, varying to yellowish red; the colors more or less mottled, never entirely even. Basal line distinct, blackish, obsoletely geminate. T. a. line upright, irregular, outer line black and distinct though narrow, inner line hardly and in some cases not at all traceable. T. p. line geminate, punctiform, its course sinuate. S. t. line distinct pale, sinuate. The costal patch at inception of s. t. line is distinct, red brown in color. There is a dusky median shade most distinct between stigmata. Claviform indicated, never completely outlined. Stigmata well sized, outlined by narrow pale annuli. Orbicular round concolorous. Reniform distinctly kidney-shaped, never constricted at each side of the middle; usually paler, more or less suffused with yellowish dusky in inferior portion. Secondaries pale smoky yellowish. Beneath pale, powdered with red; a distinct dusky extra discal line; secondaries with a discal lunule. Thorax concolorous with primaries, head paler, more yellowish.

Expands 31–33^{mm}—1.2–1.3 inches.

HABITAT.—Northern and Eastern States, Canada, and northward.

This is the nearest approach to *hospitalis* in our fauna and is well distinguished from that species by the obtuse apex of primaries. From *rubifera*, with which the species has been confounded, it is well separated by the shape of the reniform and the costal patch at inception of t. a. line. Unfortunately, I have not succeeded in getting a ♂ of this species. I doubt whether *conflua* occurs in America. I have never seen a specimen. Mr. Grote cites "Anticosti," but his examinations were made before he recognized the distinctness of *perconflua*, and I have seen specimens, undoubtedly this species, labeled *conflua* fide Grote. Mr. Butler says, Trans. Ent. Soc. Lond., 1889, 382, under *Amathus jucunda* Wlk., Lep. Het., X, 399 (*Graphiphora*), "This is the *Agrotis conflua* of Grote's collection, but not of Europe."

It is very probable that Mr. Butler is right, and that Walker's species is either the present species or something very like it. Mr. Grote was not certain as to what was really *conflua*, and he has labeled more than one species with this name. Without knowing exactly what Mr. Grote had as *conflua*, it would be unsafe to substitute *jucunda* for *perconflua*.

Noctua eriensis, Grt.

1878. Grt., Bull. Geol. Surv. IV, 177, *Agrotis.*

"♂ All the tibiæ armed. Size of *manifestolabes* and similarly colored. Ocher and reddish brown. Antennæ simple, and thus differing at once from its ally. Front and collar ochery; thorax reddish brown; anal hairs ocherous. Base of primaries and costal region diffusely ochery; else the wing is reddish brown. Lines black, broken, illegible. Stig-

mata faint, shaded with ochery, moderately large. Subterminal line nearer the external margin and more even than its ally, preceded by dark points. Hind wings pale fuscous, with yellowish fringes. Beneath much as in *manifestolabes*, common line and discal points. One specimen, Erie County, New York. (Collected by A. R. Grote, in July.)"

An apparently well-marked species with a resemblance to some forms of *perconflua* and probably somewhat intermediate in size and appearance between that species and *phyllophora*. Not known to me in nature.

Noctua phyllophora Grt.

1874. Grt., Bull. Buff. Soc. N. Sci., II, 61, *Agrotis*.
1889. Butler, Trans. Ent. Soc., Lond., 1889, 382, *Amathes*.
dahlii Beth.
1868. Beth., Can. Ent., I, 86, *Graphiphora*.

Bright red brown, somewhat roughly scaled; s. t. space and an indefinite median shade, darker; at base and along cósta powdered with bluish gray. Basal line distinct, gray; t. a. line geminate included space paler, oblique, thrice outwardly curved in its course; t. p. line geminate, lunulate, outer line more or less punctiform, its course sinuate. A row of gray venular dots follows the outer part of the t. p. line. S. t. line irregularly dentate and sinuate, marked by the contrast between s. t. and terminal space. Claviform wanting; ordinary spots large, of normal shape, indistinctly outlined, paler, centered with ground color. Secondaries smoky; beneath uniform smoky, powdered with red. Thorax concolorous.

Expands 37–40^{mm}; 1.50–1.60 inches.

HABITAT.—Northern, Middle, and Eastern States..

A broad-winged form, perfectly distinct from any other species structurally allied. Its chief peculiarities have been already referred to.

Mr. Butler cites *alternata*, *varix*, and *variata* as synonyms, but this is a wild reference. Those species are not even generically identical with the present.

It has been usual to refer this as Guenée's var. A. of *dahlii*, but a careful comparison of the description shows that this species could not have been intended, but that a large specimen of *rubifera* must have served as model for the description.

Noctua rubifera Grt.

1875. Grt., Can. Ent., VII, 207, 227, Pl. I. f. 14, *Agrotis*.
rubi‡ Grt.
1875. Grt., Can. Ent., VII, 207, *Agrotis*.
dahlii, var. A.; Gn.
1852. Gn., Sp. Gen., Noct., I, 332, *Noctua*.
1856. Wlk., C. B. Mus. Lep. Het., X, 393, *Graphiphora*.

Dark brown red, varying in depth; s. t. and sometimes terminal space darker; color very smooth, even. All the lines distinct; median lines geminate, of a darker shade of brown. Basal line distinct; t. a. line outwardly oblique, very little outwardly curved between veins; t.

p. line with an outward curve just below costa, thence almost straight to inner margin; the inner line more or less lunulate, the outer remarkably even, forming the boundary of the darker s. t. space; s. t. line very distinct, pale, sinuate. A diffuse dusky median shade most distinct between the ordinary spots. Claviform entirely obsolete, or but faintly indicated. Ordinary spots pale ringed, of good size. Orbicular round, concolorous. Reniform upright, constricted at middle, *the inner inferior angle somewhat extended inwardly.* Secondaries yellowish, fuscous; beneath smoky, powdered with red; a distinct extra discal dark line, and on secondaries a discal lunule. Thorax concolorous with primaries, head paler.

Expands 30–33^{mm}; 1.20–1.32 inches.

HABITAT.—Northern and Eastern States, Canada.

This species has been much confused in collections. I have before me now specimens labeled *rubi*, *rubifera*, *conflua*, and *perconflua*, and for some of these determinations Mr. Grote is responsible. The differences between this species and the European *rubi* have been detailed with painful exactness. Line for line they have been compared, and even *umbrosa* has been brought in; but scarcely one of the numerous differences have proved permanent when a large series of specimens has been compared. Yet the American species undoubtedly *looks* different, though the localization of the difference seems to be almost impossible. A comparison of the ♂ genitalia at once demonstrates the difference of the species; those of *rubifera* are figured; those of *rubi* are much like those of *normaniana*. The harpes are the same, but the clasper consists of one inferior short curved hook and a long corneous ridge forming part of harpe and extending obliquely upward from this hook to the finger-like process on superior margin. Of the very sudden dilation of the harpes so conspicuous in *rubifera* there is no trace. From *perconflua* this species can be always separated by the shape of the reniform, which does not vary greatly. Other differences will at once strike the student comparing the descriptions and figures. It was undoubtedly a large specimen of this species that was mistaken for *dahlii* by Guenee. I have a specimen agreeing perfectly with his comparative description

Noctua oblata Morr.

1875. Morr., Proc. Bost. Soc. N. H., XVIII, 116, *Agrotis*.
hilliana Harv.
1878. Harvey, Can. Ent., X, 55, *Agrotis*.

Bright rusty ocher, shaded with lilac gray, median space darkest; s. t. space with a purplish tint, terminal space paler ochreous. Transverse lines geminate, basal line distinct. T. a. line oblique; a very slight curve to vein 1, then a distinct outward curve to inner margin. T. p. line sinuate, inner line faintly crenulate; S. t. line marked only by the contrast in color between terminal and s. t. space, its course sinuate. Claviform distinctly evident though not completely outlined.

Orbicular very large, oblique, subquadrate, open superiorly; outlined in black, then with a rusty annulus; else paler than median space. Reniform upright, rather elongate and somewhat lunate; outlined in black, then a rusty annulus; a narrow central streak yellow. The cell is the darkest part of the wing. Secondaries yellow, with an exterior purplish shade. Beneath yellow, powdered with red. Thorax distinctly tufted, concolorous with primaries; head and collar yellow; abdomen yellow.

Expands 34–36^{mm}; 1.36–1.44 inches.

HABITAT.—Anticosti; New York; Nevada; California.

A well defined species allied to *perconflua*, but much lighter and with larger spots, the orbicular entirely different in form and characteristic of the species.

I have seen the types of both *oblata* and *hilliana* and find them entirely alike. The species seems confined to the north, or to mountainous regions. Mr. Hill's specimens were from the Adirondacks; the California specimens are from the Sierra Nevada.

Noctua rosaria Grt.

1878. Grt., Bull. Geol., Surv., IV, 172, *Agrotis.*

Pale, somewhat yellowish red brown, of variable intensity. Transverse lines entirely obsolete in the dark specimens, very faintly defined in paler forms; so far as traceable, geminate. T. a. line with a slight, even, outward curve; t. p. line very even, parallel with outer margin. T. p. line pale, sinuate, traceable on all specimens thus far seen. There is a distinct dusky median shade, darkest between the ordinary spots, but even this in dark specimens is hardly traceable. Ordinary spots sometimes concolorous and hardly definable, sometimes very distinct, powdered with yellowish scales, moderate in size, normal in form. Claviform very faintly indicated. Secondaries pale yellow fuscous. Beneath powdered with red, and with a more or less evident common extradiscal line and discal lunule. Head and thorax concolorous.

Expands 29–32^{mm}; 1.16–1.28 inches.

HABITAT.—California.

A very variable little species, no two specimens of which are alike. I have seen no male specimens, and very few females. There is no difficulty in recognizing the species as there is no other Californian form at all resembling it while having the same structural characters.

Noctua rava H. Sch.

1850. H. Sch., Schmett., VI, 59, suppl., f., *Agrotis.*
1860. Moesehl., Wien. Ent. Monatschr., IV, 367, *Agrotis.*
dissona ‡ Pack.
1867. Pack., Pr. Bost. Soc. N. H., XI, 38, *Agrotis.*
umbrata Pack.
1867. Pack., Pr. Bost. Soc. N. H., XI, 37, *Agrotis.*

Sordid luteous gray, even. Lines defined, single, dark fuscous. Basal line interrupted. T. a. line upright, slightly irregular. T. p.

line strongly crenulated, parallel to outer margin. S. t. line diffuse, even. Ordinary spots concolorous, incompletely defined. The orbicular round, reniform normal, but less complete than orbicular. Claviform faintly indicated. Secondaries of a paler shade of same color as primaries. Beneath still paler with indefinite discal lunules and common line. The ♂ antennæ have a bunch of subequal stiff hair on each side of each joint.

Expands 37mm; 1.5 inches.

HABITAT.—Labrador.

I have compared the type of *umbrata* with the description and figures of Herrich-Schæffer and believe them undoubtedly identical. The species is well defined and easily recognizable. The vestiture, as is usual with northern species, is more hairy and somewhat loose. I have also received from Mr. Moeschler specimens identified by him as *rava*, and they are the same as Dr. Packard's *umbrata*. The suggestionthat Mr. Moeschler's *dissona* may be *rava* is wide of the mark. The species seems not rare in its home.

Noctua fennica Tausch.

1837. Eversm. Bull. Soc. Imp. Mosc. I, t. 13, 4 *Noctua*.
1852. Guen., Noct. I, 270 *Agrotis*.
1857. Wlk., C. B. Mus. X, 311, *Agrotis*.
1874. Grt., Can. Ent., VI, 155, *Agrotis*.

Deep dark, somewhat blackish brown; internal margin often more or less reddish yellow; stigmata bright discolorous yellow. Transverse lines geminate, variably distinct; basal line evident; t. a. line even, *inwardly* oblique and somewhat curved: t. p. line crenulate, and somewhat sinuate, as a whole parallel with outer margin. T. p. line pale, more or less punctiform, irregularly sinuate and punctate preceded by sagittate black dashes; the two opposite cell longest. A somewhat darker shade crosses the median space. Claviform distinct very narrow, not reaching middle of median space. Orbicular variable in size, usually rather small, sometimes punctiform, oblique, ovate, or oblong. Reniform always well sized, kidney shaped; at each extremity more or less shaded with dusky. Secondaries whitish, smoky toward outer margin. Beneath powdery, with variably distinct discal spot, primaries with extra discal line.

Expands 40–50mm, 1.60–2.00 inches.

HABITAT.—New York, northward to Alaska.

Readily distinguished by the elongate dark wings and the contrasting ordinary spots. My dates for the species are September.

In the male the internal margin of primaries is discolorous yellowish, in the female concolorous. This sexual difference of color I have not noticed elsewhere in the genus. This is ordinarily a rare species, but a few years ago in Canada and the northern United States there

suddenly appeared in enormous numbers a larva which was soon called the "black army worm," and when bred, disclosed this species. The invasion seems to have ceased as suddenly as it came.

Noctua plecta Linn.

1761. Linn., Fn. Suec., 321 *Noctua.*
1767. Linn., Syst. Nat. ed XII, ii, 851 *Noctua.*
1816. Hübner, Verzeichniss, 223 *Ochropleura.*
1852. Gn., Noct., I, 326 *Noctua.*
1856. Wlk., C. B. Mus. Lep. X., 406 *Ochropleura.*
1862. Grt., Proc. Ent. Soc. Phil. I, 218 *Chersotis.*
1874. Morr., Psyche, I, 22 *Agrotis.*
1889. Butl. Trans. Ent. Soc. Lond. 1889, 384, *Ochropleura.*

Bright carmine or lake to deep red brown; costa yellowish white, sprinkled with carmine scales; a black shade from base through cell to its termination. Transverse lines wanting, s. t. line usually distinct, always traceable, pale, sinuate, variably distant from margin. Ordinary spots small, defined by narrow white annuli; orbicular round or but slightly ovate, center rather darker than ground color. Reniform lunate entirely powdered with white. Secondaries white, outwardly more or less powdered with dusky. Beneath whitish, margins very strongly powdered with red—on secondaries anterior margin only—a common dusky extradiscal line, venular on secondaries; discal lunule more or less evident, sometimes wanting.

Expands 29^{mm}, 1.15 inches.

HABITAT.—Canada to Texas, eastern United States, Europe.

This little species is so well marked, and so unlike any other species that it would not be easy to mistake it. The bright color, contrasting costa and small size are not paralleled elsewhere in the genus. Mr. Butler says *Ochropleura* Hbn. is a mere group of *Amathes* Hbn., and cites *O. vicaria* Wlk., Lep. Het. X, 409 as synonymous.

Noctua collaris G. and R.

1868. Grt. and Rob. Trans. Am. Ent. Soc. I, 348, pl. 7, f. 53, *Agrotis.*

Smoky dark fuscous, sometimes paler carneous gray, with a purplish tinge. All before and between the ordinary spots, bright velvety black. The transverse lines are very regular, even, pale gray. S. t. space a little darker and by the contrast in color with terminal space, defining the s. t. line, which is irregularly sinuate and dentate. Claviform faintly indicated. Ordinary spots pale ringed, else concolorous. Orbicular variable in size and shape, open superiorly. Reniform variable in size and shape, usually kidney shaped. Secondaries fusco-luteous, uniform. Beneath powdery, with traceable carneous line and discal lunule. Head superiorly and collar rich, deep purplish black; thorax else concolorous.

Expands 31–34^{mm}; 1.25–1.35 inches.

HABITAT.—New York, northward to Canada.

Very distinct by the very even pale transverse lines, the distinct black cell, and the rich purple black collar. The species is not commmon and varies somewhat in the direction of an obsolescence of all maculation, though these aberrant forms are not common.

Group CLANDESTINA.

Anterior tibia spinose; of normal length, the spinulation never very heavy and sometimes sparse. The head is proportionately small and considerably retracted, the front smooth. The antennæ of the ♂ are simple in both sexes, somewhat ciliate. The palpi, except in *vocalis*, are subequal, not forming a club at tip of second joint. This is a remarkably constant character, and entitled to considerable weight because it associates species so closely allied and because the clavate form of palpi is in other groups almost universal. The thorax is more or less distinctly depressed in most species, and not at all or but inconspicuously tufted. The abdomen is also as a rule more or less depressed. The primaries are of two types, rather long, narrow, and subequal, the outer margin rounded in *clandestina*, *havilæ*, *piscipellis*, and *atrifrons*. These species all agree in even color, a tendency to strigose maculation, the more or less marked obsolescence of the transverse lines and the irregular, sometimes obsolete, ordinary spots.

Piscipellis and *atrifrons* have the head blackish brown in front and the ordinary spots entirely wanting. The former is larger, red-brown, and has the s. t. line distinct, pale. The latter is smaller, carneous gray, the median lines unusually approximate, the s. t. line wanting.

Clandestina and *havilæ* have the front concolorous, the ordinary spots outlined, but usually incompletely so; the orbicular is oval, longitudinal, an irregular projection toward the reniform. In *clandestina* the dark color is even, the transverse lines rather indefinite. In the ♀ there is a remarkable excavation on each side of the penultimate segment of abdomen beneath, more particularly described hereafter. In *havilæ* the peculiarity is wanting; the color is equally dark, but irrorate with gray, and the transverse lines are very broad and gray, much more irregular than in *clandestina*.

Tepperi, *lubricans* and its variety *beata* have shorter, rather more trigonate primaries, the outer margin still rounded, a broad black shade crossing the collar.

Tepperi is white, with the transverse lines and ordinary spots marked, though not complete. *Lubricans* is dark carneous gray, outwardly shaded with brownish red. The reniform only is faintly marked, and the vestiture is very smooth and somewhat glistening. The variety *beata* agrees with the type in all respects, save that the red is replaced by smoky black.

Vocalis, *pallidicollis*, and *opacifrons* have trigonate primaries, the outer margin oblique, a perceptible though very obtuse angulation being

evident at middle. The transverse lines so far as present are distinct, single, and crenulate.

Vocalis is slightly narrower winged, the ordinary spots not marked; *invenusta* is but a dark form of this species.

Pallidicollis and *opacifrons* are broader winged, the ordinary spots are distinct, more or less marked by a dark shade in cell. In the former species the head and collar are grayish white, the primaries ocherous on disk, the ordinary spots confluent. In the latter the front is blackish, the primaries are bluish gray, the ordinary spots not confluent.

Haruspica and *sierræ* are large, broad-winged species, the outer margin oblique, but rather regularly rounded.

The former has the transverse lines distinct, crenulate; the latter has them scarcely evident, but so far as traceable they are even.

So far as the genitalia of the ♂ are concerned, they have not been examined in *vocalis*, *pallidicollis*, *opacifrons*, and *tepperi*, females only of these species being procurable.

The other species agree in having the clasper distinct, simple, and corneous, slightly differing in length and degree of curvature. The harpes furnish the variation.

In *lubricans* the entire armature agrees with that of the *incivis* group, with which, by the bye, this species has been heretofore associated. It differs, however, in structure of palpi, the small head and the obtuse primaries.

In *clandestina*, *sierræ*, *haruspica*, and *havilæ* the harpes are alike, regularly tapering to a blunt point and semicorneous.

In *atrifrons* and *piscipellis* the harpes are broad to tip where they are emarginate, the projecting points hardly acute—the superior longest.

Clemens is in some respects intermediate between the *haruspica* and *clandestina* types, approaching most nearly to the *clandestina* series, from all of which it differs by the luteous gray color.

SYNOPSIS OF SPECIES.

Large, broad-winged species, the outer margin of primaries obliquely rounded.
Color, deep smoky brown.
Transverse lines distinct, crenulate or angulate ..... HARUSPICA.
Transverse lines obsolete, even ..... SIERRÆ.
Smaller species, narrower winged.
Primaries elongate, usually subequal; outer margin rounded.
Collar concolorous.
Front, concolorous; ordinary spots evident.
Color, luteous gray; transverse lines black; interrupted, irregular. CLEMENS.
Color, deep brown; transverse lines, even, concolorous ..... CLANDESTINA.
Color, brown, suffused with gray; lines irregular, broad, gray ..... HAVILÆ.
Front discolorous, blackish brown, ordinary spots wanting.
Red brown; s. t. line distinct, pale ..... PISCIPELLIS.
Carneous gray; s. t. line obsolete; median lines approximate .... ATRIFRONS.
Collar with a broad, transverse, black shade; wings rather wider.
White; lines blackish; ordinary spots indicated ..... TEPPERI.

Deep gray shaded outwardly to red brown or blackish ..... LUBRICANS.
Primaries, trigonate; outer margin, oblique; a distinct angulation at middle.
Palpi clavate (2d joint), ordinary spots obsoletely marked; all concolorous; ash gray to blackish ..... VOCALIS.
Palpi subequal throughout; broader winged.
Front blackish; ordinary spots defined, cell blackish; color, gray. OPACIFRONS.
Head and collar pale gray; wings ocherous, with gray margins; ordinary spots confluent ..... PALLIDICOLIS.

Noctua haruspica Grt.

1875. Grt., Buff. Bull., II, 212, *Agrotis*.
1875. Grt., Proc. Ac. Nat. Sci. Phil. 1875, 424, *Agrotis*.
1876. Grt., Bull. Geol. Surv., II, 214, *Agrotis*.
1885. Smith, Ent. Amer., I, 13, *Agrotis*.
1885. Smith, Stett. Ent. Zeit., 46, 222, *Agrotis*.
1889. Butler, Trans. Ent. Soc. Lond. 1889, 382, *Graphiphora*.
unimacula Morr.
1874. Morr., Proc. Bost. Soc. N. H., XVII, 116, *Agrotis*.
1875. Grt., Buff. Bull., II, 212, n. b. l.
grandis Speyer.
1875. Speyer, Stett. Ent. Zeit., 36, 122, var *augur*.
1876. Speyer, Stett. Ent. Zeit., 37, 201 = var *augur*.
1881. Moeschl, Verh. k. k. zool. bot. Ges.
1885. Smith, Ent. Amer., I, 13, an sp. dist., *augur*.
augur Gn.
1852. Gn., Noct., I, 325, *Noctua*.
1856. Wlk., C. B. Mus., Lep. Het., X, 387, *Graphiphora*.

Even dark smoky brown. Transverse lines black, usually distinct, single. Basal line evident. T. a. line outwardly oblique, scalloped between the lines. T. p. line crenulate, parallel with outer margin. S. t. line very faint, pale, irregularly sinuate and dentate. Ordinary spots large, concolorous, of the usual shape, more or less completely outlined by a narrow black line. Claviform barely indicated. Secondaries yellowish fuscous. Beneath smoky powdery, with a common line and discal lunule dark. Head and thorax concolorous, with primaries.

Expands 44^{mm}, 1.75 inches.

HABITAT—Northern and Eastern United States, Utah and Canada.

This species will probably be found everywhere in the North and Northwest. Its large size and somber color, render it distinct.

I have pointed out for the first time in Ent. Amer., i, 13, the real distinctive characters between this species and the European *augur*. Arguments based on size and maculation would have left the matter an opinionative one for all time. The structure of the sexual characters proves the distinctness of the American form beyond all doubt.

Mr. Butler says *augur* is the type of *Graphiphora* Ochs., in which the application of the name to the *Tæniocampa* series by Mr. Grote be unwarranted.

Noctua sierræ Harv.

1876. Harv., Can. Ent., VIII, 37, *Agrotis*.

Even smoky brown, all maculation obsolete. The transverse lines are so faintly indicated as to be hardly perceptible. In course they seem much like those of *haruspica*, but are much more even, not scalloped or crenulate. The ordinary spots also are but faintly outlined, of the same general form and size as in the preceding. The secondaries are smoky; beneath as in *haruspica*.

Expands 40–42^{mm}, 1.60–1.68 inches.

HABITAT.—Sierra Nevada, California.

Somewhat more sordid in color than *haruspica*, and with the transverse lines different and less distinct, but otherwise a very close ally.

Noctua clemens Smith.

1890. Smith, Trans. Am. Ent. Soc., XVII, 44, *Agrotis*.

Pale luteous gray, with black powderings; the vestiture smooth, glistening. Head, collar, and thorax, concolorous, immaculate. Basal line distinct, geminate, black; t. a. line, geminate; outer line, broader, more distinct, the lines irregular, and, as a whole, the line irregularly outcurved and bent in the interspaces. T. p. line, distinctly geminate, interrupted; the inner line consisting of a series of irregular lunate spots; outer line, an almost evenly curved series of distinct venular dots; s. t. line pale, very slightly and irregularly sinuate, the line marked by a distinct, dusky preceding shade; a series of blackish terminal dots. A diffuse median shade darkens the cell between the ordinary spots, and is continued vaguely to the hind margin, varying in distinctness. Claviform wanting. The ordinary spots are vague, indefinite, of a very slightly paler shade than the ground color; the reniform marked with dusky. Secondaries pale smoky, somewhat whitish; the veins fuscous; beneath whitish, powdery, with an outer line and discal spot to all wings.

Expands 38–41^{mm}, 1.50–1.65 inches.

HABITAT.—California (Neumœgen.)

The specimens before me are all females, and show all the characteristic features of the *clandestina* group of the genus. The species has no close allies in the group, and while evidently referable near to *clandestina* and *havilæ* in the table, is in some respects rather intermediate between the type of the group and *haruspica*. The abdomen of the ♀ is not depressed. There is some resemblance to *pyrophiloides* in the habitus, which, however, is not likely to prove misleading.

Noctua clandestina Harr.

1841. Harris, Inj. Insects (Flint ed.), 448, life hist., *Noctua.*
1869. Grt., Trans. Am. Ent. Soc., II, 309, *Agrotis.*
1869. Saund., Can. Ent., II, 35 *Noctua.*
1869. Riley, First Rept. Ins. Mo., 79, f. 27, and pl. I f. 13, *Agrotis.*
1873. Grt., Bull. Buff. Soc. N. Sci., I, 143, *Noctua.*
1875. Speyer, Stett. Ent. Zeit., 36, 131, *Agrotis.*
1-81. Riley, Index to Mo. Repts., 55, *Agrotis.*
1883. Saunders Fruit Ins. 108, f. 106, 107, *Agrotis.*
1889. Butler, Trans. Ent. Soc. Lond., 1889, 381, = *Spælotis ravida.*
unicolor Wlk.
1856. Wlk., C. B. Mus., Lep. Het., IX, 233, *Mamestra.*
1869. Grt. and Rob., Tr. Am. Ent. Soc., II, 77 pr. syn.
1877. Grt., Can. Ent., IX, 28 pr. syn.

Dark, smoky brown, outwardly a little darker. Transverse line geminate, indistinct, included space concolorous. T. a. line oblique, dentate, and scalloped. T. p. line nearly upright, crenulate. S. t. line entirely wanting, or so indistinct as to prevent its course being clearly traceable. Claviform barely indicated, never completely outlined. Ordinary spots well defined, outlined in black, concolorous or powdered with white. Orbicular ovate, longitudinal, rather small; usually connected with t. a. line by a short spur, and with reniform by a narrow dark line. Reniform of the usual shape, but rather small in size. Along the veins of fresh specimens a whitish powdering can be distinctly traced. Secondaries pale, whitish fuscous. Beneath pale, powdery, a distinct dark discal lunule, and an incomplete common line.

Expands 40–42 mm, 1.60–1.68 inches.

HABITAT.—United States, except Southern States; Canada.

Speyer, in comparing this species with the European *ravida*, discovered a curious and apparently unique structure in the ♀. The penultimate segment of the abdomen of the ♀ has on each side beneath, a deep, smooth depression or excavation, very much resembling in shape a denuded shoulder-tippet (*patagia*). This is peculiar to the species, and though, according to Speyer, indicated in *ravida* and in some other species, is nowhere so well developed. What may be its object is at present unknown. It is scarcely worth while repeating the observed differences in maculation between this species and its European congener, because the American student will not be under the necessity of making the comparison. Dr. Speyer's paper on "Europæische-amerikanische Verwandtschaften" is recommended to the student as worthy of study in these particulars.

After Speyer's careful studies I should scarcely have expected Mr. Butler to refer our species as a synonym to *ravida* absolutely without any explanation. I certainly could not accept this dictum, even if the results of my own studies did not absolutely contradict it. Mr. Butler says that in the Grote collection he found a female labelled *A. pastoralis* Grt. This may be perfectly correct, but *pastoralis* Grt. is an entirely different species from *clandestina* and the label is erroneously placed.

Noctua havilæ Grt.

1880. Grt., Bull. Geol. Surv., VI, 157, var. *clandestina*.
1881. Grt., Papilio, I, 76, an sp. dist.
1881. Butler, Papilio, I, 169, an sp. dist.

Very closely allied to *clandestina* in ground color, shape of primaries, and indeed in general habitus. Distinct by the gray, contrasting median lines which are much more strongly dentate and irregular, and by the general grayish suffusion of primaries. The ordinary spots are less distinctly indicated, but are of the same general shape as *clandestina*. The s. t. line is also much more evident, and tolerably even. Secondaries darker, fuscous. Beneath darker, with the common line and discal lunule distinct and complete.

Expands 39–41 mm, 1.56–1.64 inches.

HABITAT.—Southern California.

This species differs from *clandestina* in the grayish suffusion of primaries and the darker secondaries.

In addition, the ♀ lacks the excavation at the sides of the penultimate abdominal segment. Though closely allied, I believe the species to be distinct.

Noctua piscipellis Grt.

1878. Grt., Can. Ent., X, 233, *Agrotis*.

Red brown, uniform in color; veins often black, transverse lines usually wanting, when present punctiform; s. t. line usually distinct, pale, gray. Ordinary spots obsolete. The t. a. line is not so present as to enable its course to be traced; t. p. line evenly curved, the black dots usually accompanied by pale, gray dots. Secondaries whitish, smoky toward outer margin. Beneath whitish, powdered with reddish toward apices; a distinct dusky common line, no discal spots. Thorax concolorous; front deep blackish brown.

Expands 35–40mm, 1.40–1.60 inches.

HABITAT.—Colorado, Nevada, Arizona.

A very distinct species. Usually the primaries have the veins marked with black, and this is like the type, but specimens occur almost uniform brown, and in some the t. p. line is tolerably well indicated but always punctiform. The palpi are subequal; the primaries comparatively narrow, outer margin rounded.

Noctua atrifrons Grt.

1873. Grt., Buff. Bull., I, 97, *Agrotis*.
1883. Grt., Trans. Kans. Ac. Sci., VIII, 47, *Agrotis*.

Gray with a reddish tint, veins somewhat marked with black scales, ordinary spots obsolete; median lines often punctiform, unusually approximate; s. t. line very indefinite but traceable. T. a. line evenly

oblique outwardly; t. p. line sinuate, inwardly bent on submedian space and thus approaching the t. a. line. Secondaries whitish, veins dusky. Beneath pale, powdery toward apices; a distinct common line. Front dusky; wings narrow.

Expands 35–38^{mm}, 1.40–1.50 inches.

HABITAT.—Colorado, Arizona, New Mexico.

Closely allied to the preceding, and distinct from it by the somewhat smaller size, the approximate, usually evident transverse lines, and the obsolete s. t. line. An Arizona specimen from Mr. Neumœgen's collection is almost uniform in color, and has a yellowish tint to the secondaries. It seems scarce distinct enough to receive a separate and specific name, though assuredly not typical of the species.

Noctua tepperi Smith.

1887. Smith, Proc. U. S. Nat. Mus., x, 452, *Agrotis.*

White, sparsely irrorate with black scales; transverse lines single, fuscous. T. a. line oblique, slightly and rather evenly convex outwardly. T. p. line sinuate, perceptibly angulate over the cell. S. t. line broad, diffuse, unusually remote from, but nearly parallel to, outer margin. A row of distinct terminal dark spots. Ordinary spots indefinite, concolorous. Orbicular small round; reniform moderate, of normal form, rather small, the outer and inferior margin black. Secondaries whitish, darker outwardly. Beneath white, powdery. Thorax concolorous, collar distinctly tipped with black.

Expands 34^{mm}, 1.35 inches.

HABITAT.—Montana.

A very distinct species, easily recognized by the pale color combined with the black tipped collar. A single specimen only in Mr. Tepper's collection.

Noctua lubricans Gn.

1852. Gn., Sp. Gen. Noct., I, 323, *Noctua.*
1856. Wlk., C. B. Mus., Lep. Het., x, 393, *Graphiphora.*
1864. Grt., Proc. Ent. Soc. Phil., III, 525 = *clandestina.*
1869. Grt., Trans. Am. Ent. Soc., II, 309, an sp. dist.; *Agrotis.*
Var. **beata** Grt.
1883. Grt., Ann. Mag. N. H. (London), 1883, 54, *Agrotis.*
1883. Grt., Trans. Kans. Ac. Sci., VIII, 54, *Agrotis.*
1885. Smith, Can. Ent., XVII, 6, pr. syn.

Ground color, bluish gray; somewhat glistening. Outwardly shaded from dark red to blackish, transverse lines varying in color to same extent. Basal line evident; t. a. line single oblique, scalloped, distinct. T. p. line hardly distinct, dark, even. S. t. line pale, but little irregular. A distinct median shade line nearest to t. p. line. Claviform and orbicular wanting; reniform faintly indicated by two parallel black marks, not

connected either above or below, and often obsolete. Secondaries pale, outwardly smoky. Beneath pale, powdered with reddish or blackish gray. Collar distinctly black-tipped.

Expands 34^{mm}; 1.35 inches.

HABITAT.—United States, generally; Canada.

A handsome and easily recognized species, occurring in two distinct forms. The eastern specimens have the outer portion of primaries more or less evidently a deep red brown, which in the extreme western specimens is replaced by blackish brown. This latter form was described by Mr. Grote as *beata*. The color is the only difference discoverable between the forms, and that is not sufficient for specific separation. I have seen a number of specimens in which the question as to whether it was *lubricans* or *beata* could only be decided by knowing where the specimens were taken.

Noctua vocalis Grt.

1879. Grt., Can. Ent., XI, 56, *Agrotis*.
1882. Grt., Ill. Essay, 54, pl. 2, f 15, *Agrotis*.
invenusta Grt.
1883. Grt., Trans. Kans. Ac. Sci., VIII, 48, *Agrotis*.

Pale to dark ash gray; transverse lines simple, darker; a distinct narrow longitudinal basal black line. T. a. line upright, evenly denticulate. T. p. line sinuate, crenulate; curved outwardly over cell, and inwardly on submedian space. S. t. line obsolete. Ordinary spots traceable, not distinct, concolorous. Orbicular ovate, a spur extending toward reniform which is normal in size and shape, but very incompletely outlined. Secondaries smoky, paler toward base. Beneath whitish, powdery, darker toward apices; a distinct common dark line and discal lunule. Head and thorax concolorous.

Expands 35–38^{mm}; 1.40–1.50 inches.

HABITAT.—Colorado, Nevada, New Mexico.

The apices of primaries are at least rectangular or even less. The second joint of palpi is distinctly clavate at tip.

I have the type of *invenusta*, and a typical specimen, bearing Mr. Grote's label *vocalis*, and they are undoubtedly identical; *vocalis* is the paler form, the maculation distinct; *invenusta* is darker, the maculation not distinct, but line for line the same. Except the difference in ground color, I find no distinguishing features, and this is not specific.

Noctua opacifrons Grt.

1878. Grt., Bull. Geol. Surv., IV, 170, *Agrotis*.

Gray, often with a reddish tint, cell between the ordinary spots more or less distinctly black. Transverse lines simple, black. Basal line evident. T. a. line slightly oblique outwardly and nearly even. T. p. line strongly crenate, its course parallel with outer margin. S. t. line often

obsolete, sometimes indicated by a slightly darker shade in s. t. space, which then forms a faint contrast in color to the concolorous terminal space. Ordinary spots moderate, concolorous, never complete, marked only by the otherwise blackish cell. Secondaries smoky fuscous, paler toward base; a distinct discal lunule. Beneath pale, powdery, with an ochreous or reddish suffusion, a common dusky shade line and distinct discal lunule. Thorax concolorous, front blackish brown.

Expands 35^{mm}; 1.40 inches.

HABITAT.—New York and northward.

Very distinct from the other dusky fronted species by the broader wings, the rectangular apices and the blackish cell. The very distinctly crenate t. p. line adds a characteristic appearance to the species.

Noctua pallidicollis Grt.

1880. Grt., Bull. Geol. Surv., VI, 154, *Agrotis*.
cinereocollis Grt.
1876. Grt., Buff. Bull., II, 79, pl. 4, f. 6, *Agrotis*.
1880. Grt., Bull. Geol. Surv., VI, 154, *n. b. l.*

Ocherous; costal and outer margin of primaries gray. Transverse lines obsolete, barely indicated, simple. T. a. line even, oblique. T. p. line angulate over cell, else parallel to outer margin. S. t. line indicated by the contrast between the s. t., and paler terminal shade. A fine, longitudinal black basal line. Ordinary spots pale, moderate in size, confluent, outlined by somewhat deeper ochreous brown. Orbicular ovate, the outer end extended and connected with reniform. Secondaries whitish, outwardly dusky and with a faint discal lunule. Beneath whitish, ochreous, powdery, with a distinct dusky common line and discal lunule. Thorax concolorous; head and collar grayish white, the latter tipped with ground color.

Expands 34^{mm}; 1.35 inches.

HABITAT.—California.

The only specimen known to me is a ♀ marked "Type" by Mr. Grote. Although the male is not at hand, I have little doubt but that the species belongs here, rather than with *attenta* and *sigmoides* with which Mr. Grote placed it. The palpi are slender and equal throughout; the primaries have the apex rectangular or very slightly produced. In coloration it is unique, and therefore very easily recognized.

Genus **CHORIZAGROTIS** Smith.

Anterior tibiæ spinose, moderately well armed at tip. Front moderate, produced into an acute or cylindrical tubercle. Antenna of ♂ simple, ciliate. Thorax depressed, untufted, or with an indefinite basal tuft only. Abdomen depressed, somewhat flattened; in *terrealis* only, normal. The primaries are elongate, rather narrow, subequal, the apices somewhat rounded. *Terrealis* here also is an exception, the primaries

being proportionately rather shorter, and more trigonate. The ♂ genitalia of the group are all of the same type, and are decidedly unique. The harpes are narrow, short, tapering towards tip, which is obliquely rounded. The clasper has a long, very stout, somewhat flattened and straight inferior fork, which is also often somewhat enlarged at tip. From the superior margin proceeds a stout, very strongly curved claw, of variable length and shape. This type is common to all species of the group, and is found nowhere else in the genus.

The species are closely allied and care is requisite in separating them.

Auxiliaris, the type of the group is also the best marked of the species; the costa, inner margin, s. t. space, an apical patch, a sub-median dash, and the inferior half of the collar are bright yellow; and this is distinctive of the species. The clasper of ♂ has the inferior portion long, little enlarged at the tip; subequal. The superior portion is very short, and curved, the tip subacute.

Introferens is very closely allied, but is somewhat smaller and the yellow is sordid; the primaries are also somewhat wider. The ♂ clasper is distinctive; though much shorter than in the preceding, the inferior portion is yet much heavier, the tip enlarged and excavated, spoon-like. The superior portion is much longer, strongly curved, the tip irregular. *Sorror* is known to me in the ♀ only; it is much smaller than either of the preceding, and, retaining the same typical ornamentation, replaces yellow by bluish gray.

Agrestis is again a large species but very evenly colored, gray over luteous or buff; the transverse lines are distinct, as are also the ordinary spots; the reniform is inferiorly dusky. The clasper has the inferior portion very long, cylindrical, slightly tapering to the tip, which is not at all enlarged, and while not acute or pointed is yet the smallest point of the process. The superior portion is very short, curved, and rather acutely terminated.

Inconcinna, with the same maculation so far as it is traceable, is more reddish brown, more evenly colored and decidedly smaller. The clasper has the inferior portion moderate in length and slightly and evenly dilated before tip. The superior portion is also moderately long, greatly curved, the tip obtuse.

Terrealis is very distinct in coloration, as has been already noted. The clasper is very nearly like that of *inconcinna*, but the forks are not at all enlarged toward or at tip.

SYNOPSIS OF SPECIES.

Abdomen distinctly depressed; colors fuscous to gray.
  Costa, internal margin, s. t. space, sub-median dash and collar bright yellow; size large ..... AUXILIARIS.
  The same portions sordid, luteous; size smaller ..... INTROFERENS.
  The same portions bluish gray; size still smaller ..... SORROR.
  Primaries uniform in ground color.
    Transverse lines and ordinary spots distinct; claviform present, size large. AGRESTIS.

Transverse lines and ordinary spots very faint; claviform wanting; size much smaller.....INCONCINNA.
Abdomen less depressed, conic; color dark fuscous brown.
Costa reddish; cell between ordinary spots black .....TERREALIS.

Chorizagrotis auxiliaris Grt.

1872. Grt., Buff. Bull., I, 96, *Agrotis*.
1875. Grt., Proc. Ac. Nat. Sci., Phil., 1875, 422 *Agrotis*.
1875. Grt., Bull. U. S. Geol. Surv., III, 118, *Agrotis*.

Fusco luteous; costal and interior margin, s. t. space, except at costa, a submedian dash, and ordinary spots yellow; the latter powdered with white. Median vein white, other veins marked with dusky. A black basal mark, reaching t. a. line; the latter geminate, outer line black, included space yellow, visible only between median and s. m. vein. T. p. line single, punctiform, parallel to outer margin. S. t. line narrow, white sinuate and dentate, an apical whitish patch. Terminal space somewhat darker. Ordinary spots distinct, powdered with white scales. Orbicular oblique ovate, moderate in size. Reniform large, kidney-shaped. All before and between ordinary spots dusky. Claviform distinctly outlined, concolorous reaching almost to the middle of median space. Secondaries smoky fuscous, somewhat paler at base. Beneath dusky, powdery; secondaries more whitish. A common line and discal lunule on all wings. Collar inferiorly yellow. Head and throax concolorous.

Expands 44–50^{mm}; 1.75–2 inches.

HABITAT.—Colorado, Texas, California.

An easily recognized species: The primaries are unusually elongate and subequal, even for this group, and the bright yellow maculation and whitish ordinary spots are characteristic. This species was in Professor Lintner's collection as *perexcellens*.

Many of the specimens named *auxiliaris* in collections are really referable to the next species.

Chorizagrotis introferens Grt.

1875. Grt., Proc. Ac. Nat. Sci., Phil., 1875, 423 *Agrotis*.
1876. Harv., Buff. Bull., III, 74, pl. 3, f. 10, *Agrotis*

In maculation like *auxiliaris;* but this species smaller in size; the yellow is sordid, often sprinkled with bluish gray, and the balance of the wing is but little darker and not contrasting. Secondaries and under side as in *auxiliaris*. Collar dull luteous.

Expands 40–44^{mm}; 1.60–1.75 inches.

HABITAT.—Colorado, Texas, California, Arizona.

Very closely allied to *auxiliaris*, than which it is much more common. So closely are the two allied that but for the very distinct variation in the male genitalia I should have called them identical; yet

though there is little absolute difference in maculation, the less contrasting colors and sordid appearance of the whole insect readily distinguish the species.

It is more than probable that large specimens of this species are generally found in collections as *auxiliaris*, and indeed I have seen examples so named by Mr. Grote, who in his new list places this species as a variety.

Chorizagrotis sorror Smith.

1887. Smith, Proc. U. S. Nat. Mus., x, 453, *Agrotis*.

Color of primaries gray, a more or less evident fuscous tint in median and terminal space; in the former not invading the costal region or hind margin, and leaving a gray dash through submedian space. All between and before the ordinary spots blackish. A black sub-basal spot. T. a. line geminate, dark, included space gray, not crossing costal space, outwardly curved between veins. T. p. line single, crenulate, parallel with outer margin. S. t. line gray, sinuate, marked by the dark terminal space, and a preceding dark shade. Claviform very faintly outlined, concolorous. Ordinary spots gray with dusky center, outlined in black; moderate in size, normal in form. Head and thorax gray; collar with a black line. Secondaries fuscous, veins dark marked. Beneath gray, powdery.

Expands 35^{mm}; 1.4 inches.

HABITAT.—Montana.

Two ♀ specimens from Mr. Hulst furnish the types. The male characters will undoubtedly be found to be much like those of *auxiliaris* and *introferens*, to the latter of which the new form is closely allied. In this group, however, of which *auxiliaris* is typical, the species seem to present absolutely no variation, and the apparent contrary shown in some collections arises simply from the fact that two and sometimes three species are very generally mixed. The maculation and habitus is nearly alike, but structurally the species differ very decidedly in the form of the ♂ genitalia.

In this species the yellow is entirely replaced by bluish gray, and there are no distinct contrasts except in the cell, which is the darkest part of the wing.

Chorizagrotis agrestis Grt.

1876. Grt., Bull. Geol. Surv., III, 118 (var. *auxiliaris*.)
mercenaria Grt.
1878. Grt., Bull. Geol. Surv. IV, 171 *Agrotis*.
flexilis Morr MSS.

Uniform bluish gray over luteous; the latter color very evident in the outer half of median space. All the lines evident, geminate, variably distinct in the specimens. T. a. line widely curved between the veins. T. p. line parallel with outer margin, outer line often very faint. A nar-

row dusky line crosses median space near t. p. line. Outer third of s. t. space and terminal space except an apical patch, darker. The narrow, pale, irregularly dentate s. t. line crosses this darker space. Ordinary spots concolorous or slightly paler, the reniform with an inferior blackish patch. In shape much as in *auxiliaris*, with which the species also agrees in secondaries and under side. Head, collar, and thorax concolorous.

Expands 44–46 mm; 1.75–1.85 inches.

HABITAT.—Kansas, Colorado, California, Texas, Nebraska.

Five specimens are before me, each from a different State; one the type of *flexilis* Mon. which so far as I can find was never described. Another labeled *agrestis* by Mr. Grote long since, and still another labeled *mercenaria* also by Mr. Grote. All these specimens differ somewhat in distinctness of maculation, but not otherwise. I have since seen many specimens which prove the correctness of the above reference.

Chorizagrotis inconcinna Harv.

1875. Harv., Buff. Bull., III, 5, *Agrotis*.

Reddish fuscous, densly sprinkled with bluish gray. Ordinary spots concolorous, narrowly outlined in black; then narrowly annulate with white or gray. Reniform with an inferior dusky patch. In shape and size the spots are like those of *mercenaria*. Claviform obsolete. Median lines obsolete; so far as traceable they are like those of *mercenaria*. S. t. line distinct, narrow, pale, sinuate, and irregularly dentate, accompanied by a slightly darker shade. A very faintly traceable shade through median space near t. p. line. Secondaries and under side precisely as in *mercenaria*.

Expands 33–38 mm; 1.30–1.50 inches.

HABITAT.—Arizona, Texas.

This species is like *mercenaria* in maculation so far as the maculation is traceable; but the much more uniform, darker color, smaller size, and entire obsolescence of claviform will suffice to distinguish the species, even without reference to the ♂ sexual pieces.

Chorizagrotis immixta Grt.

1880. Grt., Bull. Geol. Surv. VI, 259, *Agrotis*.

"♂ This species is paler than *inconcinna*, the ♂ antennæ more lengthily bristled, the fringes of the hind wings entirely pale. Pale grayish brown, the line indistinct but strongly indicated by double black costal marks. The stigmata small, not dark ringed, paler than the wing, very inconspicuous. The s. t. line relatively well marked, broken. Hind wings whitish with veins soiled, a faint terminal border and the fringes entirely pale; beneath with a dotted sub-marginal line. Fore wings

beneath smoky with an even curved extra-mesial line. Discal marks indicated. Head and thorax pale brown; second joint of palpi blackish at the side. Tarsi dotted."

Expanse 32 mm.

HABITAT.—Texas, May 12, Belfrage No. 518 (red label).

"The exterior line on primaries is unusually removed outwards towards the s. t. line. This can not be a form of *auxiliaris*, but it is not improbable that *inconcinna* is a form of that protean and widely distributed species."

I am not at all certain that I know this species. I have never seen any specimen authoritatively determined and I have had two species in my hands to either of which the description may apply, and have named both as *immixta*. One species, named for Mr. Neumoegen, from British Columbia, is probably incorrect. Some specimens in the National Museum from the Belfrage collection are probably correct.

Chorizagrotis terrealis.

1882, Grt., Trans. Kans. Ac. Sci. VIII, 47, *Agrotis*.

Dark fuscous brown, costa brick red; cell, except ordinary spots, blackish; a black basal dash. T. a. line geminate, traceable only between median and s. m. veins. T. p. line obsolete; s. t. line indicated by a few pale atoms and the slight contrast between s. t. and the rather darker terminal space. Its course sinuate, hardly dentate. Claviform distinct, narrow. Orbicular ovate, oblique, dark gray. Reniform normal, kidney-shaped, also gray. Secondaries smoky fuscous, somewhat paler toward base. Beneath smoky, secondaries somewhat paler, especially near base, and with a distinct discal lunule. Head and thorax concolorous with primaries; collar inferiorly dark brown.

Expands 37mm; 1.5 inches.

HABITAT.—New Mexico.

This species is very easily distinguished from any of the preceding by the very uniform dark color absorbing the transverse lines, and by the contrasting reddish costa. This form has the abdomen less depressed than either of the others, and thus forms in a manner the connecting form between this and allied groups.

Genus RHIZAGROTIS Smith.

All the tibiæ spinose, front rough and protuberant, hardly with a cylindrical projection; antennæ of male simple, ciliate. Primaries normally wide, the costal and inner margins not parallel, as in *Chorizagrotis*. The two genera, *Rhizagrotis* and *Chorizagrotis*, agree in the structure of front and fore legs, and are the only genera combining simple male antennæ with these characters. The peculiar wing form and habitus of the *auxiliaris* type well separate the species allied to it. With the exception of a single species, which I have named *abnormis*,

and ranked as a group, there is a general tendency to a strigose character of maculation, the ordinary transverse lines becoming more or less obscured, and sometimes entirely wanting. Of these the species ranged under group *acclivis* are dark in color and have the ordinary spots normal, not confluent; the species of group *albalis* are pale, whitish or with a yellowish tinge, the ordinary spots more or less completely confluent.

Group ABNORMIS.

As already indicated, the character separating the single species of this group from the others with which it is structurally allied is found in the presence of the normal noctuid maculation, as compared with the strigate type of the other species.

Rhizagrotis abnormis Smith.

1890, Smith, Trans. Am. Ent. Soc. XVII, 41, *Agrotis*.

The general color is carneous gray, variably shaded or suffused with a more reddish tint. Palpi brown at sides; a broad blackish transverse band at base of collar. Primaries with basal line present, geminate, black, dentate. T. a. line geminate brown or blackish, the inner line faint, included space paler in dark specimens, concolorous in pale examples; upright, outwardly angulate below costa, in the submedian interspace, and again below the internal vein. T. p. line single, or with the outer part of geminate line indicated only by a dusky costal spot and a short dusky shade, its course outcurved over, and very close to reniform, then very evenly parallel to outer margin. S. t. line very slightly paler, outwardly angulated on veins 3 and 6, emphasized by a distinct dusky preceding shade, which in pale specimens sometimes becomes the most prominent feature. A narrow, interrupted, dark terminal line. Claviform very faintly indicated by a few dark scales. Orbicular well sized, oval, oblique, sometimes not completely defined posteriorly, narrowly black ringed, concolorous in pale specimens, paler in darker examples. Reniform narrowly black ringed, of the gray ground color with a more leaden gray filling, prominent inferiorly. Secondaries of the usual dirty gray brown, somewhat paler in the male, discal spot evident. Beneath powdery fuscous, paler in the male, with distinct, though sometimes interrupted outer line and an evident discal spot on all wings.

Expands 34–37^{mm}; 1.37–1.50 inches.

HABITAT.—Sierra Nevada, California. (McGlashan).

The species at first sight seems allied to some forms in the *tessellata* group. The genital structure is different, however, the clasper not being bifurcate.

Group ACCLIVIS.

Anterior tibiæ strongly spinose, the terminal armature heavier; front broad, not much inflated, rough, granulate rather than tuberculate. Antennæ of ♂ simple or ciliate merely. The primaries are at least

normally wide, the apices rectangular. The ♂ genitalia are variable, agreeing only in that the clasper is always simple, not more than half the length of the harpes; the latter obliquely rounded at tip and inwardly furnished with a row of short spines. The maculation of primaries agrees in the somewhat strigose character, more or less obscuring the ordinary spots, and in the somewhat paler costa, *apicalis* furnishing the only exception to the latter character. The thorax is furnished with evident, though not conspicuous, fore and aft tufts.

The species are few, and they are readily distinguished. *Proclivis* is largest, and is separable at once by the unusually wide primaries, which are also very dark in color; the orbicular is round. The ♂ genitalia are distinctive. The clasper has a very short, acute, inferior projection, the superior hook being moderately long, not greatly curved, and moderately enlarged at tip. The harpes are broadly rounded at apex.

Acclivis is similar but smaller, somewhat paler, the maculation much more distinct, the orbicular is longitudinal, elongate, narrow. The ♂ genitalia are very peculiar. The harpes are much as in *proclivis*, but the clasper is much curved, somewhat flattened, dilated at tip, the dilation concave at inner side, and the whole looking for all the world like a dilapidated soup ladle.

Albicosta is uniformly dark in color, the black cell, and pale costa, and ordinary spots only relieving the uniformity; the orbicular is round. The ♂ genitalia have little in common with the preceding species, but resemble *fennica* in another group. The harpes are long, the tip oblique, with the upper angle acute or drawn-out. Clasper short, stout, dilated at middle, and with a short beak-like twist at tip.

Apicalis is an unique and easily distinguished species, uniform in color, the veins a little darker, transverse lines distinct, unusually close together, and the ordinary spots indistinct. The chief distinctive feature, however, is a blackish shade extending from reniform to apex, giving the species the characteristic appearance to which it owes its name. The clasper is simple, tapering to the tip and tolerably well curved.

SYNOPSIS OF SPECIES.

Primaries unusually wide; color very dark; orbicular rounded, with a central dot ..... PROCLIVIS.

Primaries narrower.

Orbicular elongate, more or less absorbed in the broadly pale costa ..... ACCLIVIS.

Orbicular rounded; costal space pallid; cell before and between ordinary spots black; color else dark ..... ALBICOSTA.

Ordinary spots indefinite; color evenly pale, veins only marked; a distinct broad dark shade from reniform to apex ..... APICALIS.

Rhizagrotis proclivis Smith.

1887. Smith, Proc. U. S. Nat. Mus., x, 453, *Agrotis*.

Very dark, smoky brown, or blackish; costal region broadly tinged with red brown; a reddish suffusion accompanying also the t. p. and s. t. line. T. a. line indistinct, nearly upright to vein 1, then with a wide

outward curve to hind margin; the line on close examination is geminate. T. p. line crenulate, narrow, single; its course parallel with the outer margin. S. t. line very faint, irregular, punctiform. Two longitudinal black dashes cross the line opposite the cell and terminate at outer margin. Claviform short, distinct, dark, but somewhat indefinitely outlined. Ordinary spots indistinctly outlined, concolorous with costa, faintly centered with darker scales. All the veins are more or less evidently marked with black scales. Secondaries blackish, towards base paler. Beneath smoky, powdery, all wings with discal spots. Secondaries paler with a distinct extra discal dark line, beyond which the wing is as dark as on primaries. Head and thorax like primaries; patagiæ with considerable red intermixed.

Expands, 37mm; 1.50 inches.

HABITAT.—Arizona.

Well defined by the dark color and unusually broad wings; there is a suggestion of *herelis* or allies in the habitus that is at first misleading. The simple ♂ antennæ are decisive.

Rhizagrotis acclivis Morr.

1875. Morr., Ann. Lyc. Nat. Hist., XI, 83 (Feb'y), *Agrotis*.
opaca Harv.
1875. Harv., Buff. Bull., II, 72 pl., 3 f. 1 (July), *Agrotis*.

Dark, smoky brown, or blackish; base, costal space, and all beyond t. p. line paler, more luteous, strigose. T. a. line outwardly curved between veins, not traceable above median vein. T. p. line continuous, narrow, slightly crenulate, its course parallel to outer margin. S. t. line punctiform, the dots elongate, whitish, outwardly marked by black dashes; three opposite cell most distinct, and narrowly continued to t. p. line. Claviform short, concolorous, distinctly outlined. Orbicular elongate, narrow, longitudinal. Reniform upright, normally formed. The spots pale, narrowly outlined in black; center slightly darker luteous. Secondaries smoky, paler toward base. Beneath as in the preceding species. Head dark, thorax, and especially the patagiæ, sprinkled with reddish.

Expands, 29–33mm; 1.15–1.30 inches.

HABITAT.—New York (?), Arizona, Texas.

Two specimens of this species, both males, are before me; the type, said to be from New York, is larger and somewhat sordid in appearance—evidently not fresh; the second is from southwestern Arizona, is smaller and very distinctly marked—evidently fresh. The ♂ genitalia are absolutely alike in the specimens, and I have no doubt they are identical, but I do doubt New York as the correct locality for the type. I believe that in this case Mr. Morrison has made a mistake. This species is very like *proclivis*, but is yet undoubtedly distinct. Dr. Harvey's type was evidently much like my Arizona specimen. There is no mistaking the species.

Rhizagrotis albicosta Smith.

1887. Smith, Proc. U. S. Nat. Mus., x, 454, *Agrotis*.

Very dark, smoky brown; cell, except ordinary spots and a basal dash, black; costal space and ordinary spots reddish clay yellow. All the veins more or less evidently marked. T. a. line very faintly indicated between median and s. m. vein, else obsolete; t. p. line wanting; s. t. line indicated only by a few indefinite black marks opposite the cell. Orbicular round, small, with a punctiform dark center. Reniform normal, annulate with somewhat paler yellow. Secondaries pearly white, with smoky outer border. Beneath, primaries blackish, secondaries pearly white. Thorax concolorous with primaries, with a somewhat purplish tint.

Expands, 32–42^{mm}; 1.25–1.68 inches.

HABITAT.—New Mexico, Arizona, Colorado foot-hills.

This neatly marked species is very easily recognized by the obsolete transverse lines and the pearly white secondaries.

The Colorado specimens, collected by Mr. Bruce, are distinctly larger and brighter in color, the strigation less evident. The lines are all traceable, but not evident. The habitus remains the same and the generic characters, once recognized, the specific reference is certain.

Rhizagrotis apicalis Grt.

1880. Grt., Bull. Geol. Surv., vi, 153, *Agrotis*.

Almost uniform luteous brown, veins marked with black; a blackish shade from reniform along costa to apex. Transverse lines approximate, narrow, black, even. T. a. upright. T. p. angulate over the cell. S. t. line obsolete. Ordinary spots very faintly defined, concolorous, complete, normal. Two longitudinal dark lines opposite cell from t. p. line to margin. Secondaries smoky; at base paler. Beneath powdery, primaries smoky, secondaries paler. Head and thorax concolorous with primaries.

Expands, 32^{mm}; 1.25 inches.

HABITAT—Colorado, New Mexico.

This is one of the most simply marked and most easily recognizable of our species of "*Agrotis*," but it does not seem to be one of the most common.

Group CLOANTHOIDES.

Anterior tibiæ moderately spinose, not so heavily armed at tip. Front full, rather broad, rough, granulate, hardly tuberculate. Antennæ ♂ simple, ciliate. Thorax untufted, or at most with an indefinite basal tuft. The primaries are moderate, apices rectangular, slightly produced; the colors are gray and black; transverse maculation obsolete, replaced by longitudinal strigate markings. Ordinary spots either more or less confluent or obscured by the strigæ.

The genitalia of the ♂ in the two species of which they are known are after one type. The harpe is moderate in length, decreasing in width to the tip, where it is obliquely truncate. At the inferior margin, near the base of clasper, is a short, acute semi-corneous projection. The clasper is short, stout, straight, or very feebly curved at base, tapering regularly and somewhat rapidly to tip. In *lagena* it is longer than in *cloanthoides*. The species are easily separated.

Lagena is at once distinguished by the usually confluent ordinary spots, combined, of a bottle shape; they are always at least approximate, and usually confluent. *Albalis* is separable by the very distinct strigate maculation and strongly dentate dark terminal space.

Cloanthoides is but a synonym of *albalis*, based upon a cleanly marked specimen. Mr. Graef has the type of *cloanthoides* and both the Hulst and Meske collections have specimens named *albalis* by Mr. Grote, and agreeing with his description, which are undoubtedly the same.

SYNOPSIS OF SPECIES.

Collar with a black line; ordinary spots usually confluent, bottle shaped...LAGENA.
Collar unlined; ordinary spots faintly indicated; longitudinal strigose maculation very distinct; terminal space strongly dentate.....CLOANTHOIDES.

Rhizagrotis lagena Grt.

1875. Grt., Can. Ent., VII, 26, *Agrotis*.

Pale yellowish gray; veins more or less marked with black; a black, indefinite basal dash; cell somewhat dusky fuscous, the fuscous streak continued to outer margin. Terminal space somewhat darker, deeply and irregularly indented on all the veins. Transverse lines all obsolete. Ordinary spots distinctly present, narrowly outlined in black, annulate with white; orbicular narrow, elongate, decumbent, usually reaching to and connected with the upright, lunate reniform, giving the combined spots a bottle-shaped appearance. In some specimens the spots are not quite connected, but all that I have seen have them very closely approximated at least. Secondaries white; a narrow dusky line at margin. Beneath powdery, white; an extra discal punctiform dusky line on secondaries.

Expands 38–40^{mm}; 1.50–1.60 inches.

HABITAT.—Arizona, Montana, Utah, California, Nevada.

A very well-marked species allied in appearance to *hollemani*, belonging to an entirely different group. A specimen of *hollemani* in Mr. Neumoegen's collection is labeled *lagena* by Mr. Grote. The simple male antennæ will always distinguish this species from the other.

Rhizagrotis albalis Grt.

1878. Grt., Bull. Geol. Surv., IV, 175, *Agrotis*.
cloanthoides Grt.
1880. Grt., Bull. Geol. Surv., VI, 153, *Agrotis*.

Gray, varying in shade, veins strigate with black, median lines lost. distinct black basal dash; cell slightly dusky, hind margin narrowly

fuscous. Terminal space very irregular, fuscous, projecting a long tooth inwardly opposite cell, and a second on submedian interspace. The space is completely cut on veins 3 and 4 by indentations of the s. t. line, which is marked by black cuneiform spots. Ordinary spots small, indefinite, obscured or entirely absorbed in the strigate maculation; orbicular small, V-shaped, connected by the ochery shading with the small, upright whitish ringed reniform. Secondaries white, with a narrow dusky outer margin. Beneath whitish, powdery.

Expands 32–35 mm; 1.30–1.40 inches.

HABITAT.—Nevada, Colorado.

I have seen the type of this species from Dr. Bailey's collection and the type of *cloanthoides* from Mr. Graef's collection. The former looks like a washed out specimen of the latter, but the markings are identical. I have seen other specimens, principally of the *cloanthoides* form, and believe the type of *albalis* to be a faded specimen, which can not well be matched among fresh material.

Genus FELTIA Wlk.

The distinctive characters of the species grouped under the present term are spinose and quite heavily armed fore tibiæ; protuberant, rough front, pectinated or serrate antennæ, usually wide wings with dark colors and a tendency to a radiate type of maculation. With this genus begins the series of forms in which the ♂ genitalia are after a single type, so that the type can be used in the subdivisions of the series of species. In the species grouped here, the harpes are as a whole oblong, the sides not straight, but tolerably parallel, the tip obliquely rounded, the margin inwardly set with spinules. The clasper consists of a single, simple, curved hook, variable in length, but very much alike in the species, so that it does not afford very good characters. There is one other—the following—genus which agrees in all these structural features, but differs essentially in habitus and wing form and in which the clypeal projection becomes cylindric, and more developed in type.

I have recognized two groups or series of species, the one, of which *subgothica* is typical, characterized by the open, V shaped orbicular and paler costa, the other, of which *venerabilis* may be considered the type in which the orbicular is complete or at least not open to the costa, and in which the radiate type of maculation is sometimes strongly developed.

There are two aberrant species, *annexa* and *malefida*, with narrow wings and more normal type of maculation, that should perhaps have also ranked as a group and must at least rank as a subdivision of the *venerabilis* series. The species of both groups are confused, and perhaps in the allies of *vancouverensis* the solution here, is not the true one. The difficulty of applying the proper insects to existing names is a consid-

erable one, and owing to the fact that considerable variation exists within the species, their limitation is not easy. In the U. S. National Museum collection are several series of bred specimens which will aid in the study. The ♂ antennæ will undoubtedly aid in the separation of the species as they have done in the *subgothica* series. This group I have most carefully studied and believe the arrangement entitled to be called final. The antennæ of the male here afford valuable guides, and confirm the existing separation of the forms while adding another species in a Texan form that has been variously denominated *subgothica* and *tricosa*. Dr. Riley has bred *subgothica*, *jaculifera*, and *herelis*, and the larvæ differ and further confirm the difference of the species. He has in view the preparation of a paper treating these species from the biologic side.

Group SUBGOTHICA.

This group contains species closely allied in general appearance and structure—so closely allied, indeed, that four of them have been generally considered by some as varieties of one and the same species. In structure the species agree in the main with group *venerabilis*. The tibiæ are all spinose, the anterior broadening somewhat at tip, the terminal spines strong. The front is rugose, broad, and full, apparently alike in the species. The thorax is quadrate, with a distinct, though rather low divided crest. The ♂ antennæ are serrate, differing somewhat in the species. In all these characters the species agree with the *venerabilis* group and differ from it only in ornamentation—the open triangular orbicular at once separating the species from those of the latter group. The harpes of the ♂ also agree in form with those of the *venerabilis* group; the clasper is single, long, acute, and but slightly curved.

Of the species, *olivia* is readily distinguished by the white secondaries and constricted reniform. In the remainder of the species the reniform is more or less evidently lunate, and the secondaries are dusky. *Subgothica* is small and pale, the secondaries being dusky only toward the margin. The ♂ antennæ are serrate, the joints on each side with branched spines. *Jaculifera* and *herelis* are both larger, and have dusky secondaries; *herelis* is darker, with a brownish tint, and with the maculation not so distinct, but seems otherwise so closely related that were it not for the differences in the ♂ antennæ I should not hesitate to refer them as identical. In *jaculifera* the joints are much as in *subgothica*, but the branched spines and serrations longer, while *herelis* has the joints very short, broad, with long simple lateral bristles and short spinules and ciliæ.

Pectinicornis, which most nearly resembles *jaculifera*, has the antennal joints like *herelis*, but with longer branches and even longer ciliæ.

In *olivia* the antennæ are more like *jaculifera*. Figures of all these forms are given.

In synoptic form the species stand—

Reniform distinctly constricted at middle; secondaries white ..... OLIVIA.
Reniform lunate, not constricted.
Secondaries pale, with broad dusky margin; costa, median streak and s. t. space of primaries carneous ..... SUBGOTHICA.
Secondaries blackish brown.
Antenna ♂ with joints half wider than long, inwardly armed with branched spines, outwardly ciliate. S. t. line and paler space of primaries evident ..... JACULIFERA.
Antenna ♂ with joints twice as wide as long, on each side with a long bristle and ciliæ to each joint. S. t. line and pale space of primaries indistinct or wanting ..... HERELIS.
Antennæ ♂ as in *herelis;* but lateral branches twice as long, lateral bristles also longer ..... PECTINICORNIS.

I have accepted Mr. Butler's identification of Guenee's *jaculifera.* If Guenee confused three species under one name, one of them at least ought to be retained as typical.

Feltia olivia Morr.

1876. Morr. Pr. Bost. Soc. N. H. XVIII, 238, *Agrotis.*

Reddish clay yellow; median vein and outlines of ordinary spots marked with white. An indefinite dark patch at base. T. a. line not crossing costal space; geminate; lunate between veins. Claviform short, outlined in black. Cell, except ordinary spots, blackish. Ordinary spots concolorous. T. p. line wanting. A paler apical patch. S. t. line traceable, inwardly marked by black saggitate spots, outwardly by the dark terminal space. Fringes dusky, a yellow line at base. Secondaries pearly white, veins and margins smoky. Beneath gray, powdered with blackish, both wings with discal lunule.

Expands 39mm, 1.5 inches.

HABITAT.—Utah.

The species is very easily distinguished from the others in this section by the character given in the table. The serrations of the ♂ antennæ are also longer, and rather more like pectinations than in any of the other species save *pectinicornis.*

One specimen only (the type) from Mr. Tepper's collection.

Feltia subgothica Haw.

1829. Steph., Ill. Br. Ent. Haust., II, 126 pl. 22 f. 3, *Agrotis.*
1839. Wood, Ind. Ent., 36, pl. 9 f. 149, *Agrotis.*
1856. Fitch, First and Second Rept. Ins., N. Y., 314, pl. 3, f. 1, *Agrotis.*
1873. Grt., Buff. Bull. I, 99, *Agrotis.*
1874. Lintner, Ent. Cont. III, 161, *Agrotis.*
1882. Riley, Papilio II, 44, *Agrotis.*
1883. Saund., Fruit Ins. 328, f. 329, *Agrotis.*
jaculifera var., Gn.
1852. Gn., Sp. Gen. Noct. I, 262, pl. v f. 4, *Agrotis.*
1856. Wlk., C. B. Mus., Lep. Het. x, 327, *Agrotis.*
1869. Riley First Rept. Ins. Mo. 82, pl. 1, f. 11, *Agrotis.*

1873. Grt., Buff. Bull. I, 99, pr. syn.
1881. Riley, Index to Mo. Repts., 52, pr. syn.
1882. Riley, Papilio II, 44, *Agrotis*.
ducens Wlk.
1856. Wlk., C. B. Mus., Lep. Het. IX, 203, *Feltia*.
1868. Grt. and Rob., Trans. Am. Ent. Soc., II, 77, pr. syn.
1869. Bethune, Can. Ent. I, 86, pr. syn.
1889. Butler, Trans. Ent. Soc. Lond., 377, pr. syn.

Ground color gray, with a smoky tinge; costal space, median vein, internal margin and s. t. space more or less densely flecked with white scales. Basal line distinct on costa, outwardly oblique to median vein, then inwardly angulate, distinctly white across the subbasal dark space. T. a. line straight from median to submedian vein, then with a wide outward lunation to hind margin. Claviform reaching middle of wing, blackish, surmounted by a pale streak. Cell, except ordinary spots, blackish. T. p. line lunulate, single, often indistinct, its course sinuate. A dark subapical patch. Terminal space blackish. S. t. line marked with deep black spots, strongly indenting the terminal space on veins 3 and 4. Orbicular of the same color as costal space; reniform discolorous, yellow, with a somewhat darker center. Secondaries pearly white, veins and outer margins smoky. Beneath, primaries blackish, inner margin paler; secondaries as above. Collar with narrow alternately dark and paler lines; patagiæ pale yellowish white, margined with smoky black.

Expands 31–37^{mm}; 1.25–1.50 inches.

HABITAT.—United States and Canada.

This is one of our most common species, and variable as it is in size, brightness of color and comparative depth of the pale and dark shades, the maculation is yet remarkably constant. Western specimens are as a rule somewhat larger and darker than the eastern material. Characteristic is the deep indentation into the terminal space made by the s. t. line on veins 3 and 4, and by this character alone the species can be distinguished from the others often confounded with it. The white secondaries and generally paler color are also characteristic.

Feltia jaculifera Gn.

1852. Gn., Sp. Gen., Noct. I, 262, *Agrotis*.
1869. Riley, First Rept. Ins. Mo., 82 f. 29 *b*, *Agrotis*.
1873. Grt., Buff. Bull. I, 99 = *subgothica*.
1881. Riley, Index to Mo. Repts., 55 = *tricosa*.
subgothica ‡ Pack.
1869. Pack., Guide, 306, f. 238, right-hand fig.
1883. Saund., Fruit Ins., f. 329, right hand fig.
tricosa Lint.
1874. Lint., Ent. Cont. III, 159, *Agrotis*.
1875. Harv., Buff. Bull. III, 5, *Agrotis*.
1882. Riley, Papilio, II, 44 = var. *subgothica*.
1883. Grt., Proc. Am. Phil. Soc. XXI, 156, an. sp. dist. ?
1889. Butl., Trans. Ent. Soc., Lond., 1889, 377 = *jaculifera*, type.

Of the same general appearance as *subgothica*, but differing as follows: The color is more even, the contrasts less distinct. Median vein not white; claviform short, outlines only black. S. t. line not indented on veins 3 and 4, and as a whole nearer the outer margin. The reniform also is not discolorous, but of the same color as are the light shades. There is a strong reddish tint in primaries, and the secondaries are entirely dusky.

Expands 35–37^{mm}; 1.40–1.50 inches.

HABITAT.—United States east of Rocky Mountains; Canada.

The above differences are constant, and may be relied upon to distinguish the species from *subgothica* under all circumstances. It is not so common as *subgothica*, though like it, frequents golden rod in the daytime.

The above synonymy is given on the authority of Mr. Butler, who says positively "*tricosa* Lint., is typical *jaculifera; herelis* is a poor variety." Under all circumstances Guenee's name must stand for one of the forms, since he had all three before him, and as *herelis* was first separated, the name would ordinarily be applied to the *tricosa* form. The Texan form which I have called *pectinicornis* was probably not before Guenee when he wrote. I think, however, that Harvey had this form from Texas as the basis of his note in Buff. Bull. III, 5.

Feltia herelis Grt.

1873. Grt., Buff. Bull. I, 99, *Agrotis*.
1874. Lint., Ent. Cont. III, 160, *Agrotis*.
1882. Riley, Papilio II, 44 = *subgothica*, var.
1883. Grt., Proc. Am. Phil. Soc. XXI, 156, an. sp. dist. *jaculifera* Gn. var. B.
1852. Gn., Sp. Gen., Noct. I, 262, *Agrotis*.
1873. Grt., Buff. Bull. I, 99, pr. syn.

The differences in maculation between this species and *tricosa* are difficult to define, though the insect is at a glance separable, and undoubtedly a distinct species. It is usually larger, darker, somewhat purplish in color, the costa and orbicular often entirely concolorous. The reniform varies from yellow to concolorous with the paler parts of wings pale median dash always present, and reaching the t. p. line. Secondaries almost uniformly blackish.

Expands 37–40^{mm}; 1.50–1.60 inches.

HABITAT.—With *tricosa*.

As a whole this species is larger and somewhat more robust than the preceding. The structure of the ♂ antenna is easily made out, and is the best character to distinguish it. The t. a. line in this as well as *tricosa* differs from that of *subgothica* in being oblique instead of straight across the space between median and submedian veins. From *pectinicornis* this species differs in the antennal structure, as well as in the uniform, darker color.

Feltia pectinicornis sp nov.

This species is intermediate in appearance between *subgothica* and *jaculifera*. In details of maculation it is very like *jaculifera*, while the color is more like *subgothica;* from both the antennal structure separates it. On an average it is smaller than either of its allies. It lacks the dentations on veins 3 and 4 which characterize *subgothica*, but has the paler, strigate costal region, and the black markings in the interspaces between veins 2 and 3, 3 and 4, and 4 and 5, extending from the median vein to the t. p. line. The claviform is short, as in *jaculifera*.

Thus far I have seen the species from Texas only.

Feltia evanidalis Grt.

1878. Grt., Bull. Geol. Surv. IV, 172, *Agrotis*.

"Allied to *subgothica*, a little stouter than that species, paler colored, and the antennæ are more strongly bristled. Thorax and abdomen soiled pale ochery. Fore wings colored like *subgothica*, the claviform shorter, surmounted by a broad, pale stripe, which extends to internal angle; reniform more rounded, stained with light yellow; subcostal, median, and submedian veins striped with white at base. Orbicular whitish, triangulate, absorbed superiorly, subterminal space and terminal much as in *subgothica*. Hind wings whitish, with broad diffuse borders. Beneath pale, with discal points; those on primaries pale ringed. Size of *subgothica*, or a little larger. California."

Seems a good species but is entirely unknown to me. It may be the Californian representative of the other species of this group, though in all the Californian material in the Museum and which I have lately received from Messrs. Edwards and Neumoegen there is nothing to correspond with it, though *subgothica* is represented in all sendings.

Group VENERABILIS.

All the tibiæ spinose; anterior pair slightly abbreviated, flattened, the terminal armature heavy and claw-like. Front broad, full, pitted or slightly tuberculate, differing in the species, and even in the specimens of the same species, never smooth. The antennæ of the ♂ are pectinate or evidently serrate and bristled. The harpes of the ♂ are moderate in length, rather broad, oblique at tip, the angles rounded. The clasper in the majority of species is rather short, stout, and not greatly curved. *Stigmosa* has it somewhat longer, but of the same general shape, while *annexa* and *malefida* agree in this respect precisely with the *subgothica* group. The body is stout, robust, the vestiture thick and long, hairy. The thorax is quadrate, convex, and in well-preserved specimens a distinct though not prominent longitudinal crest is evident. Except in the comparatively narrower and shorter wings no decided structural character seems to separate this group from *sub-*

gothica and allies, but the style of maculation is entirely different in most species, and they all have either the orbicular entirely complete or entirely obsolete. The costa is never pallid, but on the contrary, where there is any difference in general shade, the costal region is the darkest portion of the wing. Two well-defined subgroups are indicated by the antennal structure. In the first, the antennæ (♂) are distinctly bipectinate, the pectinations ciliate, in the second they are serrate, the serrations furnished with branched spines. In no two species are the ♂ antennæ exactly alike; but as they vary to an extent in specimens of the same species, and as the variation is one of degree rather than kind, the character is not one made use of here, except in instances where species else not easily separable can be thus readily distinguished.

The species with pectinate antennæ are but three in number, and are readily distinguished. *Circumdata* is recognizable at a glance by the reddish brown terminal space and inner margin, as well as the oblong upright discolorous reniform. *Gladiaria*, of which *morrisoniana* is a synonym, is distinguished by the pale venular streaks, showing some resemblance to *subgothica*, especially in the distinct pale streak surmounting the claviform. The s. t. line is always visible, pale in color, and preceded by a series of sagittate black spots. *Venerabilis* is a darker species, often considerably powdered with white or gray; the veins are narrowly marked with black, the transverse maculation obsolete.

From the species in the second division of the group, *annexa* and *malefida* may be separated by the longer, acute clasper of the ♂, as well as by the larger, more distinct head and more elongate primaries. *Annexa* is always readily known by the small ordinary spots, connected by a neat distinct black dash. In *malefida* the ordinary spots are large, and not connected.

Of the remaining species, *gravis*, of which *vapularis* is a synonym, is distinguished by its small size, and the annulate ordinary spots. The reniform is somewhat constricted, and at its inner inferior angle often sends out a slight spur, sometimes connecting with the orbicular. *Vancouverensis*, of which *semiclarata* is a synonym, is an exceedingly variable species, scarcely two specimens being alike. The color varies from dirty reddish yellow to bright yellow brown, often irrorate, with bright purplish gray scales. Usually a deep black claviform is a prominent feature in the appearance of the specimens, but sometimes this is hardly traceable. From *gravis* the species is distinguished by the larger size and lack of pale annuli to the ordinary spots. The paler forms of this species I have often seen in collections labeled *aeneipennis*. Indeed, Mr. Grote himself is not guiltless of some errors of this nature in collections. The type of *aeneipennis* is more evenly colored, with obsolete maculation, and with much broader and more lengthily bristled ♂ antennæ. *Volubilis*, of which *stigmosa* is a synonym, also varies greatly, some of its variations coming close to some forms of *vancouverensis*. It

may be distinguished by the usually ovate orbicular, and the strongly dentate s. t. line which is often wanting. In *vancouverensis* the s. t. line is lunate, but tolerably even and always traceable.

The following table will illustrate the differences:

Male antennæ distinctly bipectinate.
  Terminal space, ordinary spots, and inner margin of primaries discolorous, reddish; ground color, blackish brown ..... CIRCUMDATA.
  Terminal space of primaries concolorous.
    Transverse lines and ordinary spots obvious, veins more or less relieved by paler streaks ..... GLADIARIA.
    Transverse lines and orbicular obsolete, costal margin, claviform and veins blackish; else dirty yellowish gray ..... VENERABILIS.
Male antennæ serrate, bristled and ciliate; not pectinate.
  Head rather small, retracted, primaries proportionately short and narrow. Secondaries dusky.
    Ordinary spots distinctly annulate with pale yellow, reniform constricted, inferiorly produced inwardly into an acute tooth often reaching the orbicular ..... GRAVIS.
    Ordinary spots not annulate with pale.
      Primaries somewhat narrower.
        Orbicular round; s. t. line rather even, though somewhat variable. Claviform distinct, usually black or darker than ground color .. VANCOUVERENSIS.
        Maculation indistinct, as in preceding; color yellowish; antennæ of ♂ more strongly serrate, bristles longer ..... AENEIPENNIS.
      Primaries wider; orbicular usually ovate; s. t. line often lacking; when present very irregular, strongly dentate ..... VOLUBILIS.
  Head wider, more free, primaries proportionately longer and narrower. Secondaries clear pearly white.
    Orbicular small, round, connected with reniform by a distinct black dash. Claviform faintly outlined ..... ANNEXA.
    Orbicular larger, outwardly extended; no black connecting dash; claviform very large, distinct black ..... MALEFIDA.

Feltia circumdata Grt.

1883. Grt. Ann. Mag., N. H. (Lond.), 1883, 53, *Agrotis*.
1883. Grt., Trans. Kans. Ac. Sci. VIII, 54, *Agrotis*.

Thorax and primaries smoky blackish brown. Primaries with terminal space evenly yellowish or leather brown, joining a broad band of similar color along inner margin. Ordinary spots distinct discolorous leather brown. Transverse lines indistinct geminate. T. a. line very strongly angulate. T. p. line lunulate, its course sinnate. Secondaries fuscous with reddish or violet fringes. Beneath, powdered with reddish; a common extra discal line, and distinct discal dot on each wing. Abdomen brownish fuscous, antennæ yellow.

Expands 31–34^{mm}; 1.25–1.35 inches.

HABITAT.—New Mexico.

This species is so distinct that a lengthy description is unnecessary. The introduction and synoptic table give the differences from other species.

Feltia gladiaria Morr.

1874. Morr., Pr. Bost. Soc. N. H. XVII, 162, *Agrotis.*
1875. Morr., Proc. Ac. Nat. Sci. Phil., 1875, 59, *Agrotis.*
1880. Grote, Bull. Geol. Surv. VI, 163, *Agrotis.*
morrisoniana Riley.
1874. Riley, Pr. Bost. Soc. N. H. XVII, 286, *Agrotis.*
1874. Morr., Pr. Bost. Soc. N. H. XVII, 214, *Agrotis.*

Smoky blackish fuscous, often paler; veins pale, most evidently so below the middle; transverse lines indistinct; t. a. line geminate, lunate; t. p. line even, lunulate; s. t. line even, pale, preceded by very distinct black sagittate dashes. Claviform elongate, pale ringed; reniform very large, usually not entirely closed below, but entered by the pale dash along median vein. Occasionally the spots are connected. Beneath evenly gray, distinct discal lunules on each wing. Secondaries above dirty fuscous or smoky.

Expands 30–32^{mm}; 1.15–1.25 inches.

HABITAT.—East of Rocky Mountains.

A common and widely distributed species, often found in September on golden rod during the day. The inward inferior tooth of the reniform recalls *gravis*, while the very distinct median pale dash gives an idea of *subgothica* and allies.

Examination and comparison of the types proves the identity of *morrisoniana* with this species. There is absolutely no perceptible difference between them.

Feltia venerabilis Wlk.

1856. Wlk., C. B. Mus., Lep. Het. X, 328, *Agrotis.*
incallida Wlk.
1856. Wlk., C. B. Mus., Lep. Het. X, 330, *Agrotis.*
1869. Grt. and Rob., Trans. Am. Ent. Soc. II, 78, pr. syn.
1889. Butler, Trans. Ent. Soc. Lond. 377, pr. syn.

Primaries fuscous brown, often densely sprinkled with gray scales; costal region blackish, a very narrow blackish terminal space, limited by the very irregular and strongly dentate s. t. line. Other transverse lines obsolete; claviform outlined; reniform finely outlined, filled with the costal dark shade; orbicular sometimes not traceable, when present narrow, elongate, often connected with reniform by a narrow neck-like process; veins narrowly black; secondaries brownish to blackish fuscous. Beneath powdery fuscous or dark gray. Collar blackish. In pale specimens the thoracic vestiture is strongly intermixed with white.

Expands 34–37^{mm}; 1.35–1.50 inches.

HABITAT.—Canada, Eastern and Middle States.

Not uncommon, and also a day flyer. The obsolescence of the transverse maculation and the darker costal space makes this an easily recognized species.

Feltia gravis Grt.

1874. Grt. Buff. Bull. II, 155, *Agrotis.*
1875. Grt., Can. Ent. VII, 25, *Agrotis.*
vapularis Grt.,
1876. Grt., Buff. Bull. III, 81, *Agrotis.*

Color varying from carneous gray to dark blackish brown. In the darker specimens the color is even, in the paler forms the costal region is darker. Transverse lines always traceable, though not very distinct; t. a. line geminate, upright, and very slightly irregular; t. p. line crenulate, usually followed by a row of venular dots; s. t. line punctiform, spots yellowish, preceded by sagittate dashes. Claviform reaching middle of wing, distinctly ringed and usually filled with black. Ordinary spots distinct, pale ringed; orbicular moderate in size, variable in form; reniform large, constricted at middle, with a more or less evident inward projection inferiorly, which sometimes takes the form of a narrow yellow line, reaching to orbicular or even the t. a. line. Secondaries smoky to blackish fuscous. Thorax and head like primaries. Beneath powdery, with distinct extra discal line and discal spot on all wings.

Expands 31–34^{mm}; 1.25–1.35 inches.

HABITAT.—California.

I have typical specimens of both the species, and have no doubt of their identity. The pale form is *gravis*, the dark form *vapularis*. A series of ten specimens completely fills the gap between the extremes and shows them to be only variations. In structure they are identical.

Feltia vancouverensis Grt.

1873. Grt., Buff. Bull. I, 134, pl. 4, f. 4, *Agrotis.*
hortulana Morr.
1875. Morr., Proc. Ac. Nat. Sci. Phil., 1875, 430, *Agrotis.*
semiclarata Grt.
1881. Grt., Can. Ent., XIII, 132, *Agrotis.*
1882. Grt., Ill. Essay, 52, pl. 1, f. 9, *Agrotis.*
1889. Butl., Tr. Ent. Soc. Lond., 1889, 378, *pr. syn.*
clodiana Grt.
1881. Grt., Papilio I, 76, *Agrotis.*
1882. Grt., Ill. Essay, 52, pl. 1, f. 10, *Agrotis.*

Varies from leather brown to deep red brown, often strongly irrorate with gray or white scales. T. a. line obsolete; t. p. line single, crenulate, of a deeper shade of brown than ground color, outwardly curved at inception, then parallel with outer margin. S. t. line indefinite, often punctiform, marked usually by the somewhat darker terminal space, and a row of preceding sagittate dashes. A more or less defined median shade crosses the wing somewhat beyond the middle. Claviform always distinct, reaching near to the middle of the wing; usually outlined and filled with black, but often only of a deeper shade of the ground color. Ordinary spots distinct, of ground color, defined by a

whitish (never yellow) annulation and by the darker, usually black space filling the cell between. Median vein often with pale line. Secondaries fuscous. Beneath powdery, with indefinite common line, and distinct discal lunule. The thoracic vestiture is usually considerably intermixed with whitish hair.

Expands 35–40^{mm}; 1.40–1.60 inches.

HABITAT.—Vancouver, California, Colorado, Washington, Utah.

A decidedly variable species, the pale more unicolored forms of which are usually marked *aeneipennis* in collections.

The type of *vancouverensis* is large and fully marked; that of *semiclarata* smaller, and with the transverse markings obsolete. A series of eighteen specimens proves the undoubted identity of the forms. *Clodiana* also is but a form of this species with the maculation somewhat obscured. The figure in the illustrated essay is very poor. *Hortulana* Morr., is one of the forms allied to *aeneipennis*. To give a better illustration of the forms, the original description of each is reproduced."

Agrotis vancouverensis Grote.

"♂ Light brown with pale shadings. A very broad distinct basal dash, widening outwardly, extends into the median space, apparently concealing the claviform. T. a. line strongly dentate inferiorly. Discal spots set in the black filling of the cell. Transverse posterior line unusually sharply denticulate; the pale subterminal line preceded by large cuneiform brown marks. An interrupted black terminal line on the margin; fringes light brown. Hind wing fuscous without markings, save from the reflection of the black and distinct discal liture of the under surface; fringes as on primaries. Beneath fuscous without markings except the discal spots, which are unusually broad on the secondaries. Thorax above brown with darker lines on the collar."

"Expanse 40^{mm}.

"HABITAT.—Vancouver's Island.

"A rather large, broad-winged species, allied to *A. obeliscoides* and *A. venerabilis*, differing by the dentate and distinct transverse posterior line."

Agrotis hortulana Morr.

"Expanse 37^{mm}. Length of body 15^{mm}.

"Eyes naked. Antennæ of the male serrate, with the serrations pubescent. Front and vertex yellow brown. Collar with a brown central line. Thorax yellowish gray, with a dorsal divided tuft. Abdomen rounded, untufted; the lateral tufts brownish.

"Anterior wings uniform, faded yellow gray, with the ordinary markings nearly obsolete; veins darker than the ground; traces of the ordinary spots; the subterminal line is faintly seen, preceded by a series of faded cuneiform marks. Posterior wings white. Wings beneath uniform whitish gray."

"HABITAT.—San Francisco, California.

"This species seems to be distinct from the numerous Californian species published by Mr. Grote, many of which are unknown to me."

I have seen this species—I think in the Cambridge collection—and it is as I stated on a previous page one of the obscurely marked forms of *vancouverensis*.

Agrotis semiclarata Grt.

"♂ ♀ Allied to *gravis* and *vancouverensis*, smaller that the latter and without the pale cast of *gravis*. A thick, dark brown basal dash extending into the claviform, and faintly cut by the t. a. line. Rich brown, with the costal region (especially in the ♂) suffused with darker. Spots concolorous; cell shaded with black. S. t. line pale, without the small teeth at the middle and below apices of its allies. Head and collar rich yellow brown; tegulæ shaded with pale, but not so pale as in *gravis*. Beneath the costal half of secondaries is fuscous, leaving the lower portion of the wing, including the border, pale; a spot and common line. Above the hind wings are fuscous and rather dark in both sexes. This species may be known by the hind wings beneath being half pale, including the lower portion of the border, which is usually darker. The three species, *gravis*, *vancouverensis*, and *semiclarata* are nearly allied; their eastern allies seem to be *volubilis*, *venerabilis*, and *stigmosa*."

The figure in the Illustrated Essay is very characteristic and recognizable, and renders determination easy. Butler says it is the ♀ of *vancouverensis*, but I have seen both sexes of the form.

Agrotis clodiana Grt.

"♂ All the tibiæ spinose; fore tibiæ with longer terminal spines. Eyes naked. Antennæ brush-like. Allied to *gravis*, but without the distinct stigmata. Fore wings of a curious purplish brown, with a shading of yellowish. Orbicular small, concolorous, round, with a paler yellowish annulus; reniform concolorous, transverse, moderate, ringed like the orbicular. Claviform indicated, small median shade, blackish, diffuse. Lines illegible; fringes with a narrow, pale yellowish line at base. Hind wings pale, soiled with fuscous along the margins. Head and collar russet brown, collar with a pale line above a deeper shade; thorax mixed pale and brown. Beneath fore wings dark; hind wings pale, with discal marks and faint common line."

"Expanse, 38^{mm}. Washington Territory.

"A female specimen, also collected by Mr. Morrison, probably belongs here. The fore wings are entirely obscure yellowish brown, with the markings lost."

The figure of this species in the Illustrated Essay is poor, but yet recognizable and renders identification certain.

Feltia aeneipennis Grt.

1876. Grt., Buff. Bull. III, 81, *Agrotis.*

Leather brown, with all maculation subobsolete; but so far as traceable it is the same as in *vancouverensis.* The claviform, however, is barely traceable, and never forms a prominent feature in the specimen. The thoracic vestiture is somewhat less even and looser, but else I can find no distinctive feature, except the form of antennæ to separate this species. The joints of the ♂ antenna, as compared with that of *semiclarata*, are broader, shorter, serrate on both sides, the serrations longer. The ♂ genitalia are exactly as in *semiclarata.*

Expands 37^{mm}; 1.50 inches.

HABITAT.—California; Washington.

The great majority of specimens of *aeneipennis* that are found in collections are really pale forms of *vancouverensis*, and Mr. Grote himself never was quite sure of the limits of this species or of the forms he called *vancouverensis* and *semiclarata;* nor indeed could he be so without closer comparison between them than could be made between single specimens, superficially examined.

The National Museum collection contains a long series of specimens which I refer to this species. Many of them are bred, as are also many specimens of *vancouverensis.* When the larvæ of these species are described and the bred series closely studied, other characters may be found rendering separation more easy.

Feltia volubilis Harv.

1874. Harv., Buff. Bull., II, 118, *Agrotis.*
stigmosa Morr. pl. 2, f. 8.
1874. Morr., Proc. Bost. Soc. N. H. XVII, 163, *Agrotis.*

Varies in ground color from light reddish gray to dark blackish brown, costal region always darker, varying from reddish to black brown; the t. a. line is usually distinct, single, beginning on costa unusually distant from base, slightly irregular, and *inwardly* oblique to internal (submedian) vein, then with a wide outward curve to inner margin: the line is most obvious in dark specimens. T. p. line often obsolete more obvious in pale specimens, crenulate, and with a single even outward curve. S. t. line obsolete or very narrow, pale, very close to the outer margin, and very strongly and irregularly dentate, some of the teeth touching the outer margin; claviform always distinct, outlined, but rarely filled with black; ordinary spots narrowly outlined with black; orbicular usually more or less distinctly ovate; a narrow black dash between the spots and an outward sagittate black dash from middle of outer side of reniform, sometimes meeting a sagittate dash from one of the long dentations of the s. t. line. Secondaries pale to dark fuscous; beneath, powdery with a more or less evident common line and discal lunule. Head and thorax of the color of palest part of primaries.

Expands 37mm; 1.5 inches.

HABITAT.—United States and Canada.

Also a variable species; the pale forms are *volubilis*, the dark specimens *stigmosa*. The western specimens are as a rule narrower winged than the eastern forms, and I have seen some marked *semiclarata*. The strongly dentate s. t. line is, however, characteristic of this species and renders it easily recognizable.

Feltia annexa Treitschke.

1825. Tr., Schmett. Eur. v. 154, *Agrotis*.
1829. Steph., Ill. Br. Ent. Haust. II, 117, pl. 22, f. 2, *Agrotis*.
1852. Gn., Sp. Gen. Noct. I, 268, *Agrotis*.
1882. French, Can. Ent. XIV, 207, life history.
1889. Butler, Trans. Ent. Soc. Lond., 1889, 378, *Agrotis*.

Ground color clay yellow; a patch along costa beyond middle and lower half of basal space darker; veins marked with blackish; transverse lines obsoletely indicated, and so far as traceable very irregular. S. t. line moderately well marked pale, close to margin marked with a few sagittate dashes; ordinary spots small, distant, connected by a neat black dash. Claviform faintly outlined but always traceable. Secondaries clear snowy white, a few blackish scales along anterior margin. Beneath primaries powdery, secondaries indescent.

Expands 37–44mm; 1.50–1.75 inches.

HABITAT.—New York, south and west to California, Texas, Cuba.

Not an uncommon species, and with *malefida* easily distinct from all the preceding by the white secondaries, the general habitus and the form of the ♂ genitalia. From *malefida* it is distinguished by the small ordinary spots connected by a neat black dash. I have taken this species on Long Island, but do not know of its occurrence farther north. It is not included in the lists in Lintner's Entomological Contributions; it extends west, however, to the Pacific coast and south to Cuba and into South America. The larval history has been elsewhere referred to in economic publications, but these I have not cited.

Mr. Butler cites *A. anteposita* Gn., and *A. decernens* Wlk., as synonyms to this species.

Feltia malefida Gn.

1852. Gn., Sp. Gen. Noct. I, 267, *Agrotis*.
1856. Wlk., C. B. Mus. Lep. Het. X, 328, *Agrotis*.
1875. Harv., Buff. Bull. III, 5, *Agrotis*.

Pale clay yellow, with a strong admixture of pale gray scales; costal region and terminal space darker; veins marked with black scales. Transverse lines irregular and indefinite. T. a. line geminate, with a strong inward angulation on submedian vein; t. p. line crenulate, with a single even outward curve, situated unusually near the outer margin; s. t. line narrow, feebly marked, strongly dentate, so near the outer margin that some of the teeth touch it, thus interrupting the

narrow terminal space. Claviform distinct beyond the t. a. line, large, dark. Orbicular elongate, bottle shaped, outlined and centered with blackish. Reniform large, outlined with black and almost filled with smoky brown. Secondaries clean white, margins and veins sometimes more or less evidently dusky; beneath as in *annexa*. Thorax concolorous with primaries, patagiæ strongly irrorate with gray; collar blackish, with a distinct black line.

Expands 40–44^{mm}; 1.60–1.75 inches.

HABITAT.—New Jersey, south to Cuba, west to California.

Not uncommon in its localities and easily distinguished from its allies are already pointed out. The species is not uncommon in the District of Columbia, and I have it from New Jersey, but I believe not farther north. Its range south and west is parallel with that of *annexa*. The early stages have been described by Dr. Riley in some Agricultural Report.

Genus POROSAGROTIS Smith.

All the tibia spinose, armature of anterior pair very heavy. Front somewhat bulging, tuberculate, and pitted. Antenna of ♂ serrate and bristled or pectinate, the branches ciliate; pectinations moderate in length. Primaries somewhat variable in shape; most obtuse in *riley-ana*, the apices most produced in *dollii*. Thorax stout, hairy, the tuftings indefinite; in the ♂ the abdomen is furnished with loose, long hair, forming indistinct tuftings. The ♂ genitalia are alike in all the species, and this character is the distinguishing feature of the group, which else is closely allied to *pitychrous* and the forms in which the lengthily bifurcate type of clasper is so constant. In this genus the harpes are broad and moderately long; the outer margin is very oblique, the upper angle long drawn out. The clasper consists of a simple, short, curved, corneous hook. This peculiarity is the one character which distinguishes this genus, and the absolute identity in this respect of the species is remarkable indeed.

Two well-marked subgroups are indicated by the character of the ♂ antennæ. The first, of which *muraenula* is typical, has the antennæ serrate and bristled; of the same type as in the great mass of species in the groups with furcate clasper; the ordinary spots are illy defined, scarcely more than dusky blotches; the transverse maculation is very simple, often obsolete, and the species are very uniformly colored.

Four of the species belong here. Of these, *muraenula* is eastern, of a uniform bright ash gray color, the maculation reduced to a minimum, the transverse lines almost obsolete.

Catenula is western, and the close ally of the preceding; differing in the more yellowish cast of primaries, and the distinct transverse lines.

Obesula, also western, is very different from both the preceding. It is more robust, the primaries more equal, the apices rounded. The color here is also even yellowish gray, but the line is more sordid, and broken by numerous fine but very irregularly distributed fuscous points.

Mimallonis is well distinguished by the red brown color of primaries, which is unique in the genus, and suggests *gagates* of the *pityochrous* group of *Carneades*.

The second subgroup is distinguished by having the ♂ antennæ shortly bipectinate, the branches ciliate. The fringes of secondaries are unusually long—this character most evident in the ♂—and the maculation is much more completely noctuiform than in the preceding subgroup. The ordinary spots are well defined and the transverse lines are always evident. Three species may with certainty be referred here.

Of these *fusca* is most aberrant; its large size, the uniform fuscous color, and the simple t. p. line and completely defined ordinary spots serve to at once distinguish it.

Rileyana is distinguished by the uniform color, the upright t. a. line, the unusually short obtuse primaries, and the very heavy tibial armature, the latter recalling *Schinia*, while the maculation much resembles that of *catenula*.

Orthogonia is remarkable for the neat and complete maculation, and this is the only species in which the claviform is distinct.

Dollii is a pretty species, with confused maculation, the color being a dark gray in the median and terminal space and fusco-luteous elsewhere. The orbicular is elongate, at once separating this species from all the preceding. The apices of primaries are also more produced than in any other species of the group.

The other species, *milleri* and *pluralis*, which I have referred here, are known to me only in the ♀ sex, so that the reference to this group is based upon superficial characters apparently allying them to *dollii*. I believe the ♂ will be found to have the clasper peculiar to the group as well as pectinate antennæ of this section.

Milleri is easily distinguished by the dark gray color, white ordinary spots, and two pink longitudinal shades; the one below median vein, the other beyond reniform. The orbicular is bottle shaped, the small end resting on the t. a. line.

Pluralis is also unique in coloration. The margin of primaries is gray, the disc luteous, and the cell fuscous. The orbicular is subquadrate.

SYNOPSIS OF SPECIES.

Color uniform; ordinary spots indefinite; ♂ antennæ serrate.
- Primaries uniform, pale ash gray; transverse lines obsolete ..... MURAENULA.
- Primaries tinged with yellow; transverse lines distinct ..... CATENULA.
- Primaries luteous, sordid; evenly irrorate with fuscous atoms; transverse lines punctiform; form plump, heavy ..... OBRSULA.
- Primaries paler luteous, irregularly irrorate with black; transverse lines better marked and form slight ..... SATIENS.
- Primaries even, red brown; transverse lines fine ..... MIMALLONIS.

Color less uniform; ordinary spots normal; noctuidous maculation usually distinct; ♂ antennæ shortly pectinated.

Orbicular round.
Color fuscous; claviform small; lines distinct; t. a. very small, curved between veins ..... FUSCA.
Color pale luteous; claviform wanting ..... RILEYANA.
Color darker; claviform very distinctly marked ..... ORTHOGONIA.
Orbicular elongate, oval; transverse lines fine, irregular; maculation confusedly gray over luteous ..... DOLLII.
Orbicular bottle shaped; submedian and subapical shade pink ..... MILLERI.
Orbicular quadrate; reniform constricted; margin gray; disc luteous; color darker; veins white ..... PLURALIS.

Porosagrotis muraenula Grt. and Rob.

1868. G. & R., Trans. Am. Ent. Soc. I, 352, *Agrotis.*
1869. Beth., Can. Ent. I, 86, *Agrotis.*
1875. Harv., Buff. Bull. III, 73, pl. 3, f. 3, *Agrotis.*
? vetusta Wlk.
1856. Wlk., C. B. Mus., Lep. Het. IX, 78, *Mythimna.*
1882. Grt., Ill. Essay, 41, ? pr. syn.

Even, powdery ash gray; ordinary spots indefinite, blackish; t. a. line indicated by costal spots only; t. p. line punctiform and very indistinct; the points venular and very small; a terminal row of triangular black spots; secondaries clear white, outwardly somewhat powdered with black; beneath white, powdery; primaries somewhat darker.

Expands 37–40^{mm}, 1.50–1.60 inches.

HABITAT.—Canada; United States, west to the Mississippi, south to Georgia.

This species is not uncommon and is very easily distinguished by its bright color and almost entire lack of maculation. I have taken in on golden rod in September during the day.

Mr. Grote in commenting on Mr. Walker's species says the type is a white *Agrotis* very much rubbed and scarcely recognizable. Should the suggestion that it is the same as *muraenula* prove well founded, *vetusta* must, I am afraid, be used for this species.

Porosagrotis catenula Grt.

1879. Grt., North Am. Ent. I, 44, *Agrotis.*

Pale, yellowish gray, powdered with black atoms; ordinary spots very indefinite, blackish; t. a. line evident though not very distinct, single with three outward curves, that below vein 1 widest; t. p. line nearly parallel with outer margin, strongly crenulate, tending to become punctiform; a distinct black dot preceded by a clear white dot marking each vein; a row of terminal lunules; secondaries white, sometimes with smoky outer border; beneath white; primaries blackish on disc.

Expands 31–39^{mm}, 1.25–1.55 inches.

HABITAT.—Colorado, Montana, New Mexico.

Closely allied to *muraenula*, from which, however, it differs in the yellowish tint to primaries and the well-marked transverse lines. It is undoubtedly the western representative of that species and may possi-

bly, when the intervening territory is fully explored, prove a variety. The range of size in the species is unusual.

Specimens of both *muraenula* and *catenula* seen since the above was written increase the probability that they are varieties of the same species.

Porosagrotis obesula Smith.

1887. Smith, Proc. U. S. Nat. Mus., x, 456, *Agrotis*.

Rather dark yellowish gray, irregularly mottled with darker fuscous points and short lines; ordinary spots very indefinite dusky, fuscous; a fuscous subapical patch initiating the punctiform s. t. line. Transverse lines distinct, punctiform interrupted. T. a. line upright, curved between veins. Basal line distinct, geminate. T. p. line crenulate parallel with outer margin. S. t. line punctiform, even fuscous. Terminal space more densely irrorate with dark atoms. Secondaries white. Beneath, white, powdery, disc of primaries darker; a common darker extra discal line distinct only near anterior margin of secondaries but entirely crossing primaries.

Expands 38^{mm}; 1.5 inches.

HABITAT.—Montana.

The ♂ antennæ are unusually thick, the body robust, head broad, primaries obtuse. As a whole this species strikes one as being the most plump of the entire group. A single specimen only is thus far known. Received from Rev. George D. Hulst.

Porosagrotis satiens Smith.

1890. Smith, Trans. Am. Ent. Soc., XVII, *Agrotis*.

General color luteous gray, palpi brown at sides, head and thorax else immaculate. Primaries black powdered, irrorate, the ordinary maculation confused and indefinite. Basal line black, interrupted, geminate, always marked on costa at least. T. a. line marked by a geminate black costal dot and very indefinite below this, but as a whole outwardly oblique. T. p. line geminate, inner line crenulate, not very well marked, outer line a series of venular dots variably distinct; as a whole its course very even. Beyond its middle the s. t. space begins to darken to the outer margin, the terminal space being much darker than ground color, almost blackish; through this dark space the s. t. line is distinct as a series of large pale spots not much paler than ordinary ground color. A series of black terminal spots. A vague indication of a basal dash. Claviform moderate, concolorous, black marked but not completely defined. Orbicular oval, elongate, quite variable in size, black marked, then with a pale annulus, center concolorous or very little darker than ground color. Reniform large, kidney-shaped, very indefinitely and quite incompletely outlined; concolorous. In some specimens the cell is distinctly black before orbicular and between that and the reniform. Secondaries in the ♂ pearly white, in

the ♀ darker, outwardly smoky, veins dark marked, fringes white. Beneath white, with black powderings, without lines in the ♂, with an incomplete outer line and discal spot to all wings in the ♀.

Expands 34–38^{mm}; 1.38–1.52 inches.

HABITAT.—Northwest British Columbia; one ♂, two ♀ ♀.

In all structural characters this insect is nearest to *obesula* m., but has not the plump, heavy look so striking in that species; the ground color here is paler, and much more irregularly marked than in *obesula*, where the dark atoms are regularly distributed. The antennæ are as in *muræmula* rather than *obesula*, the latter having them unusually heavy.

Porosagrotis mimallonis Grt.

1873. Grt., Buff. Bull., I, 98, *Agrotis*.
1878. Grt., Bull. Geol. Surv., IV, 175, *Agrotis*.
rufipennis Grt.
1875. Grt., Can. Ent., VII, 83, *Agrotis*.
1875. Grt., Can. Ent., VII, 226, pr. syn.

Bright brownish red, terminal space slightly darker. Transverse lines very indistinct, narrow, blackish single. T. a. line upright, slightly irregular. T. p. line obsolete through the lower half of its course; nearly parallel with outer margin. Orbicular indefinite, dusky, sometimes (♀'s in my experience) with a few yellowish scales. Reniform usually dusky, indefinite; but in some ♀ specimens I have seen, the spot was considerably mixed with pale yellowish scales, and tolerably well defined. The s. t. line is obsolete, though its course may be traced by the slight contrast in color between terminal and s. t. space. Secondaries white, outwardly dusky. Beneath pale, powdered with red; most densely on primaries. Head and thorax like primaries; abdomen yellowish, powdered with red.

Expands 35–37^{mm}; 1.40–1.50 inches.

HABITAT.—Montana, New York.

Rather a peculiar distribution for this insect. The New York specimens I have seen had the transverse lines heavier, all distinct; the t. p. line crenulate. The western specimens are more smoothly scaled, and the color is more even. I can find no further difference, entitled to specific value, between them. Structurally they seem alike, but I have not examined a New York ♂.

Porosagrotis fusca Bd.

1834. Bd., Icon., pl. 48, 4, *Agrotis*.
1864. Moeschl., Wien. Ent. Monats., VI, 197, *Agrotis*.
♂ *septentrionalis* Moesch.
1862. Moeschl., Wien. Ent. Monats., IV, 133 pl. i, 3, *Agrotis*.
1870. Moeschl., Stett. Ent. Zeit., XXXI, 268, pr. syn.

Yellow or grayish fuscous, transverse lines distinct, dark; t. a. geminate; t. p. single. T. a. line oblique, very strongly curved between the veins, and more especially so beneath vein 1, where the outer point of

the curve nearly touches the t. p. line. T. p. line much as usual; outwardly curved over the cell and slightly sinuate or entirely straight below. S. t. line sinuate, marked by a series of preceding sagittate dashes. Claviform short, narrow, dusky; orbicular usually small, round, neatly outlined with black, concolorous; reniform lunate, dusky, outlined in black. Secondaries fuscous. Beneath fuscous, with indefinite line and discal dot. Head and thorax concolorous; vestiture hairy.

Expands 37–40^{mm}; 1.5–1.6 inches.

HABITAT.—Labrador.

An aberrant species to refer to this group, but which will fit in nowhere else. It is perhaps entitled to a subgroup, including it alone. With its structural peculiarities the color is unique. The ♂ clasper is practically like this group, but somewhat shorter and rather more robust. The whole appearance is more heavy or robust than any other species, and the primaries are wider. The ♀ differs in the greater proximity of the tranverse lines and in having the orbicular larger.

Forosagrotis worthingtoni Grt.

1880. Grt., North Am. Ent., I, 91, *Agrotis*.

"Male antennæ bipectinate; eyes naked, all the tibiæ spinose. Size moderate, ornamentation simple, color pale mouse gray. Thorax shaded with brownish. Anterior line faint, single, marked with black dots on the veins. Claviform absent, orbicular a small black ringlet or dot, reniform upright, narrow, moderate, pale yellowish with interior black line, situated near posterior line. The latter single, blackish, nearly perpendicular, distinctly marked by black dots followed by pale points on the veins. Subterminal line inconspicuous. A terminal broken black line. Hind wings pale, powdered with fuscous, with a terminal broken black line, else above and below without the usual spots and lines. Fore wings beneath unlined, dark gray, concolorous, contrasting with the whitish secondaries which are also concolorous, merely showing a slight dark shading on the veins in place of the usual line and a minute dot on the discal cross vein."

1 ♂ from northern Indiana.

Expands 30^{mm}.

Apparently a good species allied to *fusca*, but much smaller. Nothing in the material before me at all answers this description.

Porosagrotis rileyana Morr.

1874. Morr. Pr. Bost. Soc. N. H., XVII, 166, *Agrotis*.
1875. Morr., Proc. Ac. N. Nat. Sci., Phil., 1875, 58, *Agrotis*.

Dull yellowish gray; ordinary spots blackish, not clearly defined but with an indefinite buff annulus. The reniform is especially large, kidney-shaped. Transverse lines single, very distinct; t. a. line upright, crossing orbicular. T. p. line hardly crenulate distinct, parallel with outer margin. S. t. line very faintly traceable, irregular. Terminal

space slightly clouded with dusky. Secondaries white. Beneath all wings with discal lunule, primaries dusky. T. p. line faintly reproduced. Secondaries white.

Expands 31–34^{mm}; 1.25–1.35 inches.

HABITAT.—Illinois, Missouri, Kansas, New Mexico.

A peculiar species in many respects; the ♂ antennæ are pectinate rather than serrate, the pectinations ciliate. The primaries are rather shorter more obtuse than usual, the fringes of secondaries longer; the front is less roughened than in the other species of the group, and the anterior tibiæ are unusually heavily armed at tip. As a whole the *Heliothid* type is very strongly marked in this species and it is not at all improbable that with sufficient material at hand its nearest allies will be found to be *Anthocia nobilis* and *packardii*. The fore tibiæ are short and broad and have two heavy claws at inner side of tip and a series of five or six heavy claw-like spines outwardly. The species is left here rather for present convenience than from any conviction that it belongs where placed.

Porosagrotis orthogonia Morr.

1876. Morr., Proc. Bost. Soc. N. H., XVIII, 239, *Agrotis*.

Luteous gray; basal and s. t. spaces paler; all the lines and spots well marked. Basal line evident, marked with white outwardly; t. a. line inwardly bent on costa, straight to vein 1, then outwardly curved to hind margin; the line marked inwardly with white. T. p. line even or but slightly lunate between veins outwardly marked with white; outwardly curved over cell, and inwardly sinuate to hind margin. S. t. line distinct white, irregular, prominently dentate on veins 3 and 4. All the veins more or less evidently marked with white. Claviform distinct, concolorous outlined in black, reaching to middle of median space. Orbicular large, round, paler, centered with darker scales. Reniform large upright centered with rather bluish or smoky black scales. Head and thorax mixed yellow gray. Secondaries blackish, paler at base. Beneath whitish powdered with black; primaries dusky on disc.

Expands 31–36^{mm}.; 1.25–1.45 inches.

HABITAT.—Colorado, New Mexico, Nebraska, Arizona, Utah.

Like the preceding this species has pectinate and ciliate ♂ antennæ, the pectinations shorter than in *rileyana;* the tibial armature is heavy, and the fringes though shorter than in *rileyana* or even *dollii* are longer than usual in the genus. The ♀ fringes are not so long as those of the ♂.

Porosagrotis dollii Grt.

1882. Grt., Can. Ent., XIV, 216 *Agrotis*.

Gray, washed with luteous or ocherous the yellow tints most evident in basal and s. t. space. Transverse lines very faint; chiefly distinct by the contrast between the slightly darker, less yellow median

space, and the luteous basal and s. t. space. Terminal space like median space. T. a. line very irregularly angulate, a long tooth on vein 2, constricting median space. T. p. line irregularly dentate, its course sinuate. S. t. line traced by a series of buff cuneiform spots, and the slightly contrasting terminal space. Ordinary spots indefinite; orbicular elongate, marked with white scales, centered with gray; reniform upright, hardly lunate, and somewhat constricted, inferiorly marked with white. Thorax and head like primaries. Secondaries white. Beneath powdery; secondaries white, primaries somewhat dusky.

Expands 37^{mm}; 1.5 inches.

HABITAT.—Arizona.

This very pretty species is readily recognized by its irregularly mottled appearance, which it is very difficult to describe. Structurally it is as Mr. Grote suggests very close to *rileyana*; the ♂ antennæ are pectinate and ciliate, the fringes are unusually long, and the fore tibiæ are very heavily armed, though not so formidably as in the allied species.

Porosagrotis milleri Grt.

1875. Grt., Buff. Bull., III, 78, pl. 4, f. 4, *Agrotis*.

Gray: from the base outwardly over the claviform, across the median space runs a pink shade; beyond the reniform is a similar shading. S. t. space largely whitish before the irregular black s. t. line. Distinctly marked; lines single, black, denticulate; t. a. line with a single deeper inward inflection below submedian fold. Claviform large, distinctly outlined; orbicular funnel-shaped, the narrow portion reaching t. a. line; reniform narrow, elongate, lunate; all the spots whitish with distinct black annuli. Secondaries fuscous, fringes white. Beneath, white over fuscous; a common black shade line marked on the veins of the secondaries. Thorax and head, gray; collar with a dark line; patagiæ marked with pink.

Expands 37^{mm}; 1.5 inches.

HABITAT.—Sierra Nevada, California.

The type from Mr. Edwards' collection only examined. Unfortunately this is a ♀, so the position assigned the species is liable to change. I believe the ♂, when discovered, will be found to have pectinate antenna.

The species is easily recognized and is one of our handsomest *Agrotis*.

Since the above was written, the species has been found in some numbers. There is a bred specimen in the collection of the U. S. National Museum, and Mr. Edwards has several specimens. I do not know whether any of these are males, and Mr. Edwards' collection is at present inaccessible.

Porosagrotis pluralis Grt.

1878. Grt., Bull. Geol. Surv., IV, 174, *Agrotis.*
1880. Grt., Bull. Geol. Surv., VI, 144, *Agrotis.*
1882. Grt., Ill. Essay, 55, pl. 2, f. 16, *Agrotis.*

Gray, the middle portion of primaries suffused with yellow ocherous. Transverse lines barely traceable, very slightly paler than the space through which they pass. S. t. line distinct, pale, inwardly shaded with fuscous, two evident teeth on veins 3 and 4. A slightly paler apical patch. All the veins more or less evidently marked with white, veins 3 and 4 and 6 and 7 unusually distinctly so. The cell except ordinary spots and a shade over veins 2, 3, and 4, fuscous. Orbicular pale, moderate in size, somewhat oblique. Reniform upright, constricted at middle, and inferiorly dilated; annulate with white, the center dark gray. Secondaries smoky, paler at base. Beneath, powdery white; disc of primaries more dusky. Head and thorax gray mixed with blackish, margins of patagiæ yellowish buff.

Expands 37^{mm}; 1.5 inches.

HABITAT.—Nevada.

The ♀ type from Dr. Bailey's collection is the only specimen examined, and the place assigned to the species is therefore liable to be erroneous. The general habitus of the species seems to place it here, and I think that the ♂ when discovered will have pectinate antennæ.

Genus CARNEADES Grt.

Fore tibiæ strongly spinose, with longer lateral spines at tip, which is somewhat broadened. Front of head rough, tuberculate, with usually a central depression. Palpi distinct, normally developed, reaching to about middle of front. Antennæ in the male with the joints marked laterally with tufts of bristly hair; in the female simple with single short ciliations, sometimes scarcely pubescent. Wings trigonate, apices marked but not prominent, outer margin oblique, rarely rounded save in the *quadridentata* series. Harpes of the ♂ oblong with oblique tip, which is inwardly set with a series of spinules. Clasper bifurcate, the forks varying in proportion.

The strong distinctive feature of the genus is in the last character—the forked clasper of the male genitalia. In all other characters it agrees perfectly with that section of *Porosagrotis* of which *muraenula* is the type. The series with this character constitutes by far the most numerous group of the genus *Agrotis* auct. The greater proportion of the species are western, and the greater part of the western *Agrotid* fauna belongs to this genus. In structural characters and somewhat in habitus the resemblance to the Heliothinæ is marked. It is a fact of very great interest that this fauna of the far west should so preponderate in species which have the heavy tibial armature and modified frontal structure.

Besides containing very much the greater number of species, the

species are also most closely allied. The large degree of uniformity in genital structure robs us of one of our safest and most certain guides, while the extreme range of variation in many of the forms makes the limitation of species difficult. It is in this series, too, that constant additions are being made to the species. Scarcely a collection reaches my hands that does not contain some markedly distinct species, and our work of a monographic nature must remain partly tentative until the western region has been so thoroughly explored that the additions are not so constant.

In adopting the generic term *Carneades* I have consulted convenience and merit more than priority. Mr. Grote in this case recognized the frontal structure as differing from *Agrotis*, but he was evidently ignorant of how many species agreed with his generic type in this respect. His earlier genus, *Eucoptocnemis* for *fimbriaris*, I have not used because I am not sure the insect really belongs here. I have seen it but never had a chance to study it. I know positively that many of the exotic and European species must find a place in this same series, but have not been able to apply the generic terms which exist in abundance to any type with which I was acquainted. So large an assemblage, agreeing so closely in structural characters, proved difficult of subdivision, since I was reduced to characters of maculation and coloration. Some little intelligence and care will therefore have to be applied in referring some of the species to their respective series.

First in the line I place a small group of which *wilsonii* is typical. It differs from all the others in the longer wings and depressed costal margin. The appearance is somewhat like the *auxilliaris* series from which the structural characters well separate it.

Following this is the group *quadridentata*, which is characterized by the name of its type. Veins 3 and 4 and 6 and 7 are marked with white, and strongly indent the s. t. line, the spurs usually attaining the outer margin. The feature is a distinctive one and there is only one species in which there is room for doubt as to its reference here. The species are not very well separated and there may be more or less than I have indicated.

Group *pityochrous* differs by the general indefiniteness of maculation. Sometimes the color is uniform, sometimes the lines are wanting, and sometimes the lines are indicated or even fairly distinct, and the ordinary spots are vague and indefinite. The median shade line is never present, and the cell is never black filled. Most of the species are readily referred here, and only a few, which will be more particularly referred to hereafter, are liable to cause doubt.

Messoria is typical of another group, all the members of which have the median shade line evident. The cell is never distinctly black filled, the lines are sometimes the only definite feature of maculation. of the species here, which vary in the line of an obsolescence of ation, may create doubt with a small number of specimens, but

can in all cases be correctly referred with a sufficient material. Finally come those species of which *tessellata* is typical, and which agree in always having the cell dark or black filled in well-marked specimens. The transverse lines may be present or absent, but the ordinary spots are always outlined in part, at least, by the intermediate black or dusky shade.

The description of each group is very fully given and exceptional characters are noted. I have left the full characterization to each, even at the risk of some repetition, as I considered it well to have each capable of standing alone.

The synopsis of genera and groups renders another table unnecessary.

Group WILSONII.

Anterior tibiæ spinose, rather heavily armed at tip. Front prominent, tuberculate, rough. Antennæ ♂ serrate and bristled, of the same type as in allied groups. Thorax quadrate with indefinite, inconspicuous tuftings. Primaries moderate, costa depressed, slightly concave, apices produced. This feature of the primaries is peculiar to the species of this group.

The genitalia of the ♂ have the harpes short and rather broad, the clasper bifurcate, the tines subequal and reaching almost to the tip of the harpes. The inferior branch of the fork is straight, regularly tapering to an acute point; the upper is more equal, slightly curved and not acute at tip.

Two species only belong to this group, closely allied, but yet easily separated.

Wilsonii is a pretty, brightly marked species with pale ordinary spots and distinctly paler yellow or red s. t. space; the t. p. line is distinct; the s. t. line not marked.

Lacunosa is closely allied, but darker, much more evenly colored. The t. p. line is obsolete; but the s. t. line is distinct preceded by black sagittate dashes.

Nothing is known of the early stages of the species.

In maculation and habitus this series is intermediate between the *quadridentata* and *tessellata* groups, and resembles more particularly the *ochrogaster* series in the latter group. The peculiar wing form, however, allows me to head the genus with this small series.

Carneades wilsonii Grt.

1873. Grt., Buff. Bull., I, 135, pl. 4, f. 3, *Agrotis*.
1874. Grt., Buff. Bull., II, 62, *Agrotis*.
specialis Grt.
1874. Grt., Buff. Bull., II, 62, *Agrotis*.
1882. Grt., Ill. Essay, 54, pl. 2, f. 14, *Agrotis*.

Fusco luteous to bright red of various intensity; costa to apex, narrow inner margin, and s. t. space paler luteous. Basal line marked in cell, white, margined each side with a blackish shade. T. a. geminate,

upright, sinuate, not reaching costa; included space whitish. T .p. line lunulate, interrupted, single; sharply defining the paler s. t. space, its course inwardly oblique even, hardly curved over cell. S. t. line not defined; marked only by the contrast in color between terminal and s. t. space. This outline is very irregular; the terminal shade sends in a broad angulation opposite the cell, is much narrowed on veins 3 and 4, and again broader to hind margin. Claviform concolorous, narrowly outlined in black, short and rather broad. Ordinary spots well defined, narrowly annulate with white, centered with pale yellowish. Orbicular irregularly ovate; reniform normal. Secondaries yellowish fuscous. Beneath white, powdery; primaries with disk smoky; all wings with dusky discal lunule. Head and thorax concolorous; collar inferiorly whitish yellow.

Expands 37–44^{mm}; 1.5–1.75 inches.

HABITAT.—California.

A pretty and well defined species with no peculiarities, not already enumerated; it varies from luteous to bright red brown, the latter being typical of *specialis*. Mr. Edwards' collection shows both forms. The antennal difference noted by Mr. Grote exists in terms only. *Wilsonii* equally has "tufts of bristles on the joints" and at the same time both forms have them "brush-like."

The U. S. Museum collection contains a very pretty series of this species showing the very wide range of variation in ground color. Scarcely two specimens are entirely alike, and yet the characteristic appearance of the species is so marked that no mistake is possible in its recognition.

Carneades lacunosa Grt.

1878. Grt., Bull. Geol. Surv., IV, 72, *Agrotis*.

Fuso luteous, sordid; cell darker, shaded with blackish, costa very slightly paler. A darker longitudinal basal shade crossed by the narrow basal line and limited outwardly by the t. a. line. This latter as in *wilsonii*, but less distinct. T. p. line very faintly indicated, obsoletely geminate; its course as in *wilsonii*. S. t. line distinct narrow, pale, limiting the somewhat darker terminal space; preceded by a row of sagittate black spots, its course sinuate, not greatly divergent at any part of its course. Ordinary spots essentially as in *wilsonii*, but not so contrasting, the center being almost concolorous. Secondaries and underside as in *wilsonii*.

Expands 35–39^{mm}; 1.40–1.50 inches.

HABITAT.—California.

With essentially the same maculation this species is yet very distinct from *wilsonii* by the obsolete t. p. line and well marked s. t. line. The collar is concolorous, but is crossed by a dark line. The species is credited to Mr. Morrison in lists, but I can not find that he ever described it. Mr. Grote's description above cited is the first appearance of the species in literature so far as I know, and he should be credited with it.

Carneades æqualis Harv.

1876. Harv., Can. Ent., VIII, 36, *Agrotis*.

" ♀. Allied to *Wilsonii* and especially resembling some of the varieties of that species, but distinguishable by the s. t. line not being twice more prominently indented, but pale, dentate throughout its length, and by the concolorous terminal space and larger stigmata. Hoary olivaceous fuscous with a tinge of brown; claviform indicated; orbicular large, irregularly elongate; reniform wide; cell shaded with brown. T. p. line geminate, regularly lunulate. Fringes brown discolorous. Hind wings fuscous, deepening in tint outwardly, with pale, faintly interlined fringes and long, narrow discal streak; beneath whitish, irrorate on costal region, with faint terminal shade and discal mark; primaries fuscous. Thorax and head concolorous with fore-wings.

" Expanse 38mm. California."

Apparently a good species allied to *lacunosa*. Entirely unknown to me in nature. I can not identify it with any of the numerous Californian species known to me.

Group QUADRIDENTATA.

This is characterized by strongly armed anterior tibiæ, prominent, roughened, and somewhat tuberculate front, serrate and strongly bristled male antennæ and bifurcate clasper. The distinctive character separating it from the other group with which it agrees in structure is found in the ornamentation. Peculiar to it is the maculation from which the typical species has received its name; veins 3 and 4, and to a less extent veins 6 and 7, are marked with pale streaks, extending to and strongly indenting the terminal space. In addition, the ordinary spots are always distinct, the costa usually perceptibly paler, the orbicular often oblong and open superiorly, the median vein more or less marked with white, and a more or less distinct submedian pale dash. On the whole this group is rather closely allied to *subgothica* through *flavidens*, and to *venerabilis* through *brevipennis*. The other species more evidently resemble the other groups nearest allied in the structure of the male genitalia. In this latter character the species agree tolerably well among themselves. Except in *olivalis* the lower fork is longest and tolerably straight. In *niveilinea*, *flavidens*, and *plagigera* this lower fork reaches to or exceeds the tip of the harpes, the tip somewhat curved and not pointed. In the other species the lower fork is stout, straight, regularly tapering to an acute point, and does not reach the tip of the harpes. *Olivalis* is unique in having the lower fork very short and stout, rapidly tapering to an acute tip. The upper fork and the harpes show little variation, the former being nearly evenly and equally curved, and the latter being oblong and rounded or obliquely truncate at tip. As a matter of fact the genitalia are not exactly alike in any two species; but the differences are so slight and so difficult to

express in words that a reference to the figures of the plates, where all important types are figured, is deemed sufficient.

The species are not numerous, but some of them are closely allied, and not a little confusion is found in collections. In separating the species of the series with dusky secondaries I am not at all satisfied that I have hit the best solution of the problem. The present scheme worked well when prepared, and does still in the vast majority of instances, but material since seen indicates new species which will probably render a re-arrangement necessary. A character not appreciated when the synopsis was prepared is found in the s. t. line and the upper two of the pale outward dentations. Without a complete re-study of the material this can not now be made use of except as indicated in the descriptions. I may have given some erroneous determinations in this group by reason of the overlooking of this feature, and placing too much stress on the form of the orbicular—a character not so satisfactory in point of constancy as I had supposed.

The group may be divided into two, nearly equal series, by the color of the secondaries and the ground color of the primaries. In the first series the secondaries are white, and the primaries show yellow or yellowish gray as the predominating color. In the second series the secondaries are yellow fuscous or smoky, and the primaries darker gray or fuscous.

Among the first series *recula* may be distinguished by its small size, clear, bright yellow ordinary spots, and other ornamentation, the contrasting dark shadings bringing this maculation into prominent relief. *Cicatricosa* and *quadridentata* are larger, with similar markings but less intense color. These species are hopelessly confounded in collections even by Mr. Grote. Both species vary in brightness of color and somewhat in maculation. *Cicatricosa* may be distinguished by the open, V-shaped orbicular and the constricted reniform; *quadridentata* has the orbicular closed, somewhat variable in size and shape, and the reniform lunate or kidney-shaped. The types of all of the preceding species have been examined by me. *Niveilinea*, which has been labeled *quadridentata* in some collections, is easily distinguished by the white line crossing the thorax back of the collar.

Insertans and *brevipennis* differ in the oblong, elongate orbicular. In the former the ordinary spots are connected or fused, the orbicular not oblique, the form not unusually stout. *Brevipennis* is an unusually stout species with oblique orbicular, not fused or connected with reniform. The thorax is very heavy and large, the anterior tuft most prominent, the abdomen very short and scarcely exceeding secondaries.

Plagigera is a well-marked species of the second series, nearly allied to *brevipennis*. The ordinary spots are narrow, well marked, outlined with black, then annulate with white, else concolorous; the orbicular is oblong, oblique, open superiorly; the t. p. line is very indefinite, usually punctiform and somewhat irregular. The pale dents on veins 6 and 7 do not cross the s. t. line.

Yet nearer, perhaps, to *brevipennis* is *oblongistigma*, which is rather well distinguished by the uniform sordid, smoky color and the narrow, oblong, concolorous ordinary spots. The orbicular is open superiorly, oblique. The cell around the ordinary spots is black, and there is a black basal dash. The dents on veins 6 and 7 cross the s. t. line.

Olivalis is a puzzling species, standing almost midway between *plagigera* and *ridingsiana*. It has the narrow, oblong orbicular of the former and the marked t. p. line of the latter; the somewhat more yellowish fuscous secondaries turn the scale of resemblance to *ridingsiana*, and the ♂ genitalia confirm this. The pale dents of veins 6 and 7 do not cross the s. t. line.

Ridingsiana differs from the previous species of the series in having the orbicular rounded and complete. The costa is concolorous, the veins only flecked with white scales. The dents on veins 6 and 7 do not cross the s. t. line.

Flavidens is a large species and is very distinctly marked. The costa is yellow, the median stripe is very distinct, and the ordinary spots are annulate with pale yellow. The pale dents on veins 6 and 7 cross the s. t. line.

Flavicollis is like the preceding in general habitus, but differs by the yellow collar, the even and very distinct s. t. line, and the rounded apices of primaries. The pale dents do not cross the s. t. line on veins 6 and 8.

Perexcellens is one of the handsomest of our species, and the best marked of this group. It is very large—sometimes expanding over two inches—the maculation essentially like *flavidens*, but much brighter, suffused with reddish to lilac gray. The apices of primaries are somewhat produced, the dents on veins 6 and 7 do not cross the s. t. line, while on veins 3 and 4 the indentation of the line is not great. It is the only species of the series in which the group character is not prominently marked. In tabular form we have the following:

SYNOPSIS OF SPECIES.

Secondaries white, primaries gray to yellow.
  Smallest; ordinary spots and median stripe, clear yellow.....RECULA.
  Larger; the yellow paler, more white.
    Orbicular, open above; V-shaped.....CICATRICOSA.
    Orbicular, round, complete.
      Collar paler gray or yellow, no white line crossing thorax....QUADRIDENTATA.
      Collar concolorous, a distinct white line crossing thorax behind collar, NIVEILINEA.
    Orbicular oblong.
      Ordinary spots fused, orbicular not oblique, abdomen normal.....INSERTANS.
      Ordinary spots not fused, orbicular oblique, abdomen short, conic, BREVIPENNIS.
Secondaries dusky, primaries darker.
  Orbicular narrow, oblique, open superiorly.
    Ordinary spots concolorous, relieved by black filling of cell; t. p. line obsolete, OBLONGISTIGMA.

Ordinary spots outlined in black, annulate with white; t. p. line punctiform and somewhat irregular; secondaries whitish ..... PLAGIGERA.
T. p. line well defined, even; secondaries yellowish..... OLIVALIS.
Orbicular rounded, complete.
Costa concolorous, size small, pale colors white..... RIDINGSIANA.
Costa and pale colors yellowish.
Collar concolorous; thoracic tuft yellow; apices of primaries rectangular, FLAVIDENS.
Collar yellow inferiorly; thoracic tuft concolorous; apices of primaries rounded ..... FLAVICOLLIS.
Collar white inferiorly, limited by a black line; size very large; pale colors suffused with reddish or lilac, very bright; apices of primaries somewhat produced ..... PEREXCELLENS.

Carneades recula Harv.

1876. Harv., Can. Ent., VIII, 37, *Agrotis*.

Deep smoky brown; costal and submedian spaces, inner margin at base, a subapical patch and ordinary spots yellow. S. t. line distinct, yellowish, indented as usual by the four pale streaks, and marked inwardly by black cuneiform dashes. Secondaries white. Beneath white. Head and inferior half of collar white or creamy. Thorax luteous, intermixed with both black and white hair and scales. Abdomen yellowish white.

Expands 25^{mm}; 1 inch.

HABITAT.—Oregon.

This small and very distinc species is recognized by the contrast in color of primaries. It must be very pretty when perfect; but all the known specimens are rubbed and also imperfectly spread. All the examples thus far seen in collections come from Mr. Hy. Edwards.

Carneades cicatricosa G. & R.

1865. Grt. & Rob., Proc. Ent. Soc. Phil., IV, 492 pl. 3, f. 4, *Agrotis*.

Ground color yellowish white. Costa marked with blackish scales; in the cell there is only a small triangular spot marking the anterior boundary of the V-shaped orbicular, and a narrow space between spots dark fuscous. T. a. line marked only below median vein; t. p. line curved over the cell, thence straight to internal margin; extended slightly along the veins; space between reniform and t. p. line dark. S. t. line well marked, even, scarcely indented on veins 3 and 4; outwardly marked by the dark terminal space, inwardly by a row of lunate spots. Claviform well defined, dusky. Basal space below median vein dusky. Secondaries white. Beneath white. Head and thorax luteous. Collar inferiorly and patagiæ near sides, white.

Expands 29–31^{mm}; 1.20–1.25 inches.

HABITAT.—Colorado.

It is difficult to describe an insect like this, in which the ground color may be either one thing or the other so far as predominance is concerned, and where the maculation is so irregular. The V-shaped orbicu-

lar, constricted reniform, and unusually distinct and even s. t. line are characteristic, however, and may be relied upon to distinguish the species. It seems rare, very few specimens having passed through my hands.

Carneades quadridentata G. & R.

1865, Grt. & Rob., Proc. Ent. Soc. Phil. IV, 491, pl. 3, ff. 2 and 3, *Agrotis.*

Deep luteous brown or olivaceous; costa to t. p. line, internal margin and submedian stripe yellowish; s. t. space also paler than ground color. Ordinary spots complete, outlined in black, whitish, with faint yellowish center. T. a. line single, with two wide outward curves. T. p. line lunulate, very even; s. t. line narrow, pale, inwardly marked by a series of approximate black lunules. Claviform faintly marked, concolorous. The dentations on veins 3 and 4 cross the s. t. line and almost attain the outer margin; on veins 6 and 7 they half way cross the terminal space. Secondaries white, a few black scales along outer margin. Beneath primaries dusky, secondaries white; sometimes the primaries are also pale. Head and thorax concolorous; collar inferiorly yellow, patagiæ white. Occasionally a reddish tinge replaces, or is mixed with the yellow of primaries but the maculation remains the same.

Expands 30–32^{mm}; 1.20–1.28 inches.

HABITAT.—Colorado.

A very neatly marked species, not at all common in collections. I believe I have seen this from New Mexico and Arizona, but can not be certain. The character of the s. t. line will very readily separate it from the preceding which it otherwise resembles in habitus.

Carneades niveilinea Grt.

1882. Grt., Can. Ent. XIV, 216, *Agrotis.*

In maculation very like *4-dentata;* so like, that recapitulating all points seems useless, and only points of difference will be given. The size is greater, the color darker, the yellow on costa and veins replaced by white, else by reddish. The collar and patagiæ are concolorous, but there is a white stripe crossing the thorax just behind collar, which will at a glance identify this species. Secondaries and beneath as in *4-dentata.*

Expands 35^{mm}; 1.40 inches.

HABITAT.—Arizona, New Mexico.

Seems not uncommon species where found, and is very constant. Rarely a rubbed specimen will be confused with *quadridentata.*

Caneades insertans Smith.

1890. Smith, Trans. Am. Ent. Soc. XVII, 45, *Agrotis.*

General color a rather sordid yellow. Head and palpi immaculate, collar with a distinct black central line above which the color is somewhat more dusky. Thorax with black scales intermixed, forming an

incomplete line margining the patagiæ. Primaries with the median lines practically obsolete, the t. a. line traceable only by a single loop below the claviform and the t. p. line marked only by geminate costal dots. A basal black streak, to which is attached the loop-like claviform. The cell is black around and between the ordinary spots, which are connected; an unbroken black line margining both. Orbicular elongate, with a slightly darker core; a narrow spur extending to the reniform, which is moderate in size and kidney-shaped. A black spot below reniform. The s. t. and terminal spaces are prominently marked by the four pale streaks so characteristic of the 4-*dentata* series of this genus; the black intermediate dashes distinct; no distinct s. t. line. Secondaries clear, pure white. Beneath white, somewhat powdery, without line or spot.

Expands 33^{mm}; 1.32 inches.

HABITAT.—British Columbia, Spencer's Bridge.

The type is a unique male from Mr. Neumoegen; easily distinguished from all the members of the group by the united ordinary spots and elongate orbicular.

Carneades brevipennis Smith.

1887. Smith, Proc. U. S. Nat. Mus., x, 455, *Agrotis*.

Ash gray, with somewhat darker shadings through center and in terminal space. Orbicular oblique, open superiorly; reniform oblique, elongate, somewhat constricted in the middle. Both the spots are defined by a narrow, black line and a pale interior ring; else concolorous. Claviform very distinctly outlined. Transverse lines faint, in one specimen entirely obsolete. T. a. line geminate, visible only in submedian space. T. p. line not traceable at all. S. t. line white, indefinite, indented to half the extent of terminal space on veins 3 and 4. Apex pale. Secondaries white, with blackish terminal line. Beneath white, primaries rather densely, secondaries sparsely powdered with black scales. Head and collar inferiorly paler; else thorax concolorous.

Expands 36–38^{mm}; 1.45–1.50 inches.

HABITAT.—California, Colorado, Nevada.

A very peculiar species, recognizable by its burly form and unusually short abdomen. The head too is somewhat retracted, but in other respects it does not differ from the other species with which we have placed it. There are several specimens in the collection of the U. S. National Museum, taken by Mr. Bruce in Colorado.

Carneades oblongistigma Smith.

1887. Smith, Proc. U. S. Nat. Mus., x, 454, *Agrotis*.

Ground color an even, very dark gray or dirty fuscous. Cell before and between ordinary spots, blackish; a blackish basal dash; terminal space darker; claviform filled with blackish. Transverse lines obsolete; s. t. line concolorous, marked by the darker terminal space, and

a row of sagittate black dashes inwardly. The usual dentations cross the s. t. line, and reach nearly to the outer margin. The orbicular is open superiorly, oblique, oblong, somewhat variable in size, sometimes reduced to a mere line. The reniform is narrow, lunate. Secondaries smoky fuscous. Beneath pale, somewhat iridescent, powdery; secondaries with a distinct discal spot. Thorax concolorous with primaries; collar with a mesial black line.

Expands 30–32^{mm}; 1.20–1.25 inches.

HABITAT.—Montana, Black Hills.

This species recalls *idahoensis*, and is indeed very closely allied to it; differing obviously, however, by the dentations typical of this group.

Carneades plagigera Morr.

1874. Morr., Proc. Bost. Soc. N. H. XVII, 163 *Agrotis*.
1875. Morr., Proc. Ac. Nat. Sci. Phil., 1875, 57 *Agrotis*.

Smoky fuscous, strongly irrorate with white. Costal region strongly marked with white scales, as is also the inner margin and the s. t. space; a white apical patch. Transverse lines not well marked. T. a. line distinct only in the submedian space where it forms a slightly angulate outward curve. T. p. line crenulate, often punctiform, its course below the cell nearly straight or slightly incurved. S. t. line bisinuate, indented, but not crossed by the ordinary marks on veins 3 and 4. The basal line is indicated by a double black spot at base. Claviform concolorous, narrowly outlined in black. Orbicular elongate, narrow, oblique, almost longitudinal. Reniform narrow, slightly constricted at middle, upright. Secondaries dirty white with a fuliginous cast. Beneath whitish, powdered with gray. Head and thorax concolorous, the latter marked with white at base of patagiæ.

Expands 31–35 ^{mm}; 1.35–1.40 inches.

HABITAT.—Colorado, Montana, Nevada, Kansas, Washington, Illinois.

This species may be always recognized by the dirty whitish, not yellowish, secondaries. This character will serve to at once separate it from *olivalis* which is else closely allied to it. From *oblongistigma* the species is distinct by the fact that the ordinary dents do not cross the s. t. line

Carneades olivalis Grt.

1879. Grt., N. Am. Ent. I, 43, *Agrotis*.

Dark olive or grayish, costal region powdered with white; transverse lines not very distinctly marked, but still evident. T. a. line distinct below median vein, narrow, black, outwardly curved between veins. T. p. line single, evenly crenulate, and nearly parallel with the outer margin. S. t. line white, narrow, indented as usual on veins 3 and 4. The ordinary spots are concolorous, narrowly outlined in black and with an inner somewhat powdery, white annulus. Orbicular narrow, oblong,

oblique, open superiorly. Claviform concolorous, outlined in black. There is a pale apical patch connecting with a pale shading to the t. p. line. Median and submedian veins powdered with white scales. Submedian pale dash scarcely traceable. Secondaries smoky fuscous, with a faint yellowish tinge. Beneath deep smoky brown, with a darker common line and discal spot. Thorax concolorous, collar inferiorly powdered with gray.

Expands 31^{mm}; 1.25 inches.

HABITAT.—Colorado.

This species forms the intergrade between *ridingsiana* and *plagigera* while sufficiently distinct, I think, from each. The points of resemblance have been already noted.

Carneades ridingsiana Grt.

1875. Grt., Bull. Buff. Soc. Nat., Sci. II, 305, *Agrotis*.

The maculation of this species is almost exactly like that of 4-*dentata*, but the color is much darker. The t. a. line is outwardly oblique and takes a wide outward bend below vein 1; the s. t. line is not so strongly indented on veins 3 and 4; but in all other respects the primaries are marked like 4-*dentata*. Secondaries yellowish fuscous. Beneath soiled whitish, powdery. Head and thorax concolorous with primaries; collar inferiorly gray.

Expands 31–32^{mm}; 1.25 inches.

HABITAT.—Colorado, Arizona, New Mexico.

This species except for the much darker color, and almost concolorous costa is identical in maculation with 4-*dentata* and different from the preceding species of this section by the complete, rounded orbicular.

It is in the series from *plagigera* to *ridingsiana* that is usually confused and which requires care in separation. By close attention to the distinctive characters given there ought to be little trouble in the majority of cases; but occasionally an unfortunate specimen will occur which does not agree with anything but itself and which requires tact to place.

Carneades flavidens Smith.

1887. Smith, Proc. U. S. Nat. Mus., X, 455, *Agrotis*.

Dark blackish fuscous; costa yellowish; submedian dash yellow, and very distinct; s. t. space powdered with white, paler. Basal line indicated by black spots on median vein; t. a. line geminate, distinct below subcostal, outwardly curved to inner vein, then very oblique outwardly to inner margin. T. p. line single, lunulate, interrupted by the yellow s. m. dash; its course almost parallel with outer margin. S. t. line narrow, concolorous, marked by a row of internal black spots and indented by the usual pale streaks on veins 3 and 4, and 6 and 7, the latter confluent and forming a pale patch. Ordinary spots distinct, normal; narrowly defined with black, within annulate with yellow centered with

dark buff. Claviform very long, extending to middle of wing, narrowly outlined with black, else concolorous. Secondaries smoky fuscous, paler toward base. Beneath, primaries smoky, blackish; secondaries paler, powdery. Head and thorax concolorous; disc tufted with yellowish. In some specimens the yellow becomes pinkish, whether naturally so or because the insect may have been affected by cyanide, it is impossible to say.

Expands 34–36^{mm}; 1.35–1.45 inches.

HABITAT.—Colorado, Arizona.

This species has a very strong superficial resemblance to *subgothica* and allies, principally marked by the very evident submedian dash and long claviform. It however evidently belongs here by the structural characters. The distinct yellow maculation and dark ground color separates this from all the preceding forms.

Carneades flaviceollis Smith.

1887. Smith, Proc. U. S. Nat. Mus., x, 456, *Agrotis*.

Dark red brown; all except ordinary spots, claviform, basal space, and terminal space darker; costa broadly yellow; ordinary spots powdery white. Submedian dash distinct, though not broad, yellow. T. a. line distinct below costal space, outwardly oblique and curved between the veins. T. p. line lunate, single, interrupted parallel with outer margin. S. t. line even, distinct, yellow, inwardly marked by sagittate black dashes; usual dentation reaching to but not crossing or greatly indenting s. t. line. A pale patch at apex. Ordinary spots complete, narrowly black lined, normal in size and form. Secondaries smoky fuscous. Beneath with a faint rufous tinge, powdery. Head and thorax concolorous with primaries, collar inferiorly yellow.

Expands 31^{mm}; 1.25 inches.

HABITAT.—Montana.

The unique type in Mr. Tepper's collection is a ♀, but probably belongs to this group. The rounded apices of primaries well distinguish this species from all others and may indicate that its allies are elsewhere.

Carneades perexcellens Grt.

1880. Grt., Bull. Geol. Surv., VI, 156, *Agrotis*.
excellens Grt.
1875. Grt., Trans. Am. Ent. Soc., v, 115, *Agrotis*.
1880. Grt., Bull. Geol. Surv., VI, 156, n. b. l.
docilis Grt.
1880. Grt., Bull. Geol. Surv., VI, 259, *Agrotis*.

Blackish fuscous; costa, internal margin, a variably broad submedian dash and s. t. space gray, reddish, yellow, or lilac, all the colors very bright and clean. Apical patch always somewhat bluish white Ordinary spots pale; white more or less irrorate with yellowish; orbicular oblique, moderate in size, irregularly ovate; reniform lunate,

[illegible]

nary lines obsolete. The genitalia of the ♂ are peculiar; the harpes taper to a rather acutely rounded tip, the clasper is very broad and heavy, the inferior branch very thick at base, tapering rather abruptly to an acute tip, the upper branch slightly curved, not much longer than the inferior, perceptibly enlarged toward the tip.

Sponsa is a rather uniform, very dark gray species with all the maculation indistinct. The primaries are rather short and wide.

Cogitans is luteous gray, the transverse lines obvious. It differs from all the preceding by a distinct black basal streak.

The three species, *hollemani*, *atristriga*, and *biclavis* have the black-lined collar, and have the ordinary spots confluent, neatly outlined by a whitish line. The tendency is to a strigate type of maculation, while the transverse lines are obsolete.

Hollemani has dusky secondaries, and the primaries are dark and gray. The species is variable in size and has no contrasts in shade or marking.

Atristriga has the secondaries white with a broad dusky outer margin. The primaries have an oblique paler shade extending inward from the apex, and another extending inwardly over veins 3 to 4.

Biclavis is pale gray with white strigations, and the secondaries are white. These three species are distinct from all others in the group and easily separable *inter se*.

None of the other species have a black-lined collar. Associated by the dusky secondaries and dark colors of the primaries is a small series rather distinctly separated from the others.

Perpolita is very dark blackish brown, somewhat greasy in appearance, and with rather short, broad wings. The genitalia of the male are somewhat peculiar. The harpes are somewhat corneous, the edges incurved, the whole tapering to an acute tip. The clasper is normal, except that the upper branch is rather more curved than usual.

Fumalis is very dark gray; the transverse lines distinct, black, single; t. p. strongly crenulate. The ordinary spots are indefinite.

Perfusca is a smaller species, more fuscous in color, and with all the markings obsolete.

Pastoralis is a blackish, somewhat roughly scaled species, the transverse lines not visible, the ordinary spots neatly picked out with yellow scales. From the range of variation noted in a series of bred specimens of my *infelix*, there is a possibility that it may prove but a strongly marked form of *pastoralis*, though the typical form is close to *perexcellens* in appearance.

Finis is a smaller, somewhat narrower winged, and rather paler species. The lines and ordinary spots are all distinct, and there is a red brown shade through sub-basal and s. t. space.

Velleripennis with black primaries is easily distinguished by its pure white secondaries.

Atomaris is a close ally and may possibly prove a race of the preceding. The color is paler, powdery, the maculation usually distinct.

Texana and *gagates* are distinguished by somewhat more produced apices of primaries, the colors leaving the gray to black type and getting toward fuscous or brown; the secondaries dusky. *Texana* is a large species, the maculation fairly evident, the ground color varying from a clay-yellow shot with reddish to a rather deep red brown, the maculation becoming indefinite and sub-obsolete. *Gagates* is smaller narrower-winged, red brown, the ordinary spots always distinct, dusky, the transverse lines obsolete.

The balance of the species vary from a pale ash to a darker shade of the same color, mingled with a variable quantity of yellow and red.

Three species have pure white secondaries. *Citricolor* has bright lemon yellow primaries, the terminal space rather darker. *Misturata* is sordid luteous, evenly colored, the ordinary spots and transverse lines visible. *Moerens* is a close ally of *citricolor*, but with a paler rusty shade, the lines more distinct. This species is omitted from the synopsis because I did not have it for comparison when the tables were made up. It is the type of the genus.

Four species have the secondaries pearly gray, somewhat irridescent.

Dolis has the primaries very pale, even bluish gray, the t. p. line indicated by a row of whitish, lunate spots.

Scandens is a very variable species in the shade of gray, but it is always distinguishable by the well-defined s. t. line, which is preceded by a distinct, darker shade.

Choris differs obviously; it is of a rather dark shade of gray, the transverse lines rather even and well defined, the ordinary spots distinct, completely outlined.

Remota is paler with a decided carneous shade, the ordinary spots distinctly marked.

In the remaining species the secondaries are dusky or fuscous.

Three of the species have comparatively narrower, moderately elongate wings, much as in the immediately preceding forms, but narrower than the other species in the same series.

Pitychrous varies in shade from a rather pale clay yellow to rather dark fuscous gray. The median and terminal spaces are always darker, the ordinary spots evident and discolorous, s. t. line even.

Infracta is a smaller species, clay yellow, sordid, the median and terminal spaces darker, s. t. line very irregular, ordinary spots not discolorous.

Luteola is very evenly colored, sordid clay yellow, with concolorous ordinary spots. The orbicular is very small, the s. t. line even, somewhat remote from outer margin.

The remaining two species are shorter and wider winged, the wings more distinctly triangular.

Serricornis is an ochreous species with prominent s. t. line preceded by a distinct dark shade, the remaining maculation indistinct.

Tetrica is much more evenly colored, gray over a luteous base; all the lines evident, but none distinct.

As a whole, the species in this group are decidedly variable, and while with care there should be no serious difficulty in recognizing the species, yet hasty or ill-considered comparison is nowhere more likely to blunder than here. I have endeavored to give the specific peculiarity of each species, but it must be recollected that probably some of the forms vary more than even the large material at my command indicated. Single specimens should always be very cautiously determined where they are at all off type.

In a more condensed form the scheme appears in the following table:

SYNOPSIS OF SPECIES.

Collar with a black transverse line or shade.
  Ordinary spots not confluent.
    No longitudinal line at base.
      Primaries luteous, maculation indistinct ..... BICOLLARIS.
      Primaries gray, costal space darker, mottled with fine transverse striga, BROCHA.
      Primaries evenly dark gray, wider; maculation faint ..... SPONSA.
    A distinct longitudinal black line.
      Luteous gray, transverse lines obvious ..... COGITANS.
  Ordinary spots confluent, primaries strigate.
    Secondaries dusky, primaries dusky, strigate with white ..... HOLLEMANI.
    Secondaries white, with a broad soiled outer margin; primaries dusky, a pale apical shade, and a similar pale shade below cell to near outer margin ..... ATRISTRIGATA.
    Secondaries white, primaries gray, strigate with white ..... BICLAVIS.
Collar concolorous, without transverse black line or shade.
  Primaries dull dark gray to black, secondaries dusky.
    Primaries purplish black, ordinary spots incompletely outlined in deep velvety black ..... PERPOLITA.
    Primaries deep dark gray, transverse lines distinct, single, t. p. crenulate; ordinary spots indefinite ..... FUMALIS.
    More fuscous, maculation all subobsolete ..... PERFUSCA.
    Blackish, lines obsolete, ordinary spots neatly defined by yellowish scales, PASTORALIS.
    Somewhat paler, all maculation evident, a purplish shade through basal and s. t. space ..... FINIS.
    Primaries black, secondaries white, maculation obsolete, ordinary spots neatly outlined ..... VELLERIPENNIS.
    Primaries more smoky, secondaries white, ordinary spots not distinctly outlined, transverse maculation obvious ..... ATOMARIS.
  Primaries fuscous to brown, apices produced, secondaries dusky.
    Larger, wider winged, all maculation traceable ..... TEXANA.
    Smaller, narrower winged, transverse lines wanting, ordinary spots dusky, GAGATES.
  Primaries varying from ash to yellow gray.
    Secondaries white.
      Primaries bright yellow, terminal space darker, ordinary spots obsolete, CITRICOLOR.
      Primaries even, luteous; spots complete ..... MISTURATA.
    Secondaries pearly white iridescent.

Primaries even, somewhat bluish gray; t. p. line punctiform, the points lunate.....DOLIS.
Primaries yellowish to carneous gray, maculation obsolete, s. t. line only distinct, marked by a darker preceding shade.....SCANDENS.
Primaries dark gray, transverse lines and ordinary spots distinct.....CHORIS.
Primaries carneous gray, pale; ordinary spots distinctly marked...REMOTA.
Secondaries dusky to blackish.
Narrower winged.
Clay yellow or paler to dark fuscous gray, median and terminal spaces darker, ordinary spots distinct, pale; s. t. line even.....PITYCHROUS.
Smaller, luteous; median and terminal spaces darker, ordinary spots concolorous, s. t. line very uneven.....INFRACTA.
Even, luteous; all maculation traceable, but faint; t. p. line very evenly crenulate; s. t. line rather even, somewhat remote from margin, LUTEOLA.
Wider winged, the primaries comparatively shorter, more trigonate.
Primaries reddish ocherous, s. t. line very distinct, marked by a darker preceding shade; t. p. line punctiform.....SERRICORNIS.
Primaries luteous, shaded with gray, very even; s. t. line indefinite, maculation else perceptibly marked.....TETRICA.

Carneades bicollaris Grt.

1878. Grt., Bull. Geol. Surv., IV, 173, 174, *Agrotis*.
1883. Grt., Proc. Am. Phil. Soc., XXI, 155, *Agrotis*.

Grayish luteous, sometimes with a reddish shade, all maculations indistinct. T. a. line geminate, slightly oblique outwardly, barely waved between veins. T. p. line sinuate, rather obsoletely geminate. S. t. line sinuate, slightly paler, relieved by a preceding, somewhat darker shade, variably distinct and complete. Ordinary spots more or less completely defined, concolorous or with a somewhat dusky shade, rarely orbicular entirely obsolete. Claviform with a bare trace in one specimen, usually obsolete. Secondaries fuscous. Beneath yellow fuscous, powdery; a variably evident common line and distinct discal spot. Head and thorax concolorous, collar with a broad black line.

Expands 33–37^{mm}; 1.30–1.50 inches.

HABITAT.—California, Arizona, Nevada.

This species has a certain false air of the *cupida* group that misled Mr. Grote in his description of the species and in his subsequent arrangements and lists.

Two ♀ specimens from Arizona agree with typical California specimens in structure and in detail of maculation, but the color is much more even, shot with reddish, and the primaries have the outer margin evidently more oblique. Possibly with a larger material this form may prove distinct.

Carneades brocha Morr.

1875. Morr., Proc. Ac. Nat. Sci. Phil., 1875, 56, *Agrotis*.
bochus Morr.
1874. Morr., Proc. Bost. Soc. N. H., XVII, 163, *Agrotis*.

Somewhat bluish gray, the costa and outer margin shaded with brownish, the wing marked with narrow, irregular brown striga. Trans-

verse lines obsolete; the t. p. line punctiform, dots venular. Claviform wanting. Ordinary spots indefinite. Orbicular usually wanting or obsolete; reniform dusky lunate; a somewhat indefinite median shade crosses the median space over reniform. Secondaries white, narrowly margined with dusky. Beneath, white, powdery, a common dusky transverse line and discal spot; the line on secondaries punctiform. Thorax and head concolorous, collar broadly dark brown inferiorly.

Expands 37^{mm}; 1.5 inches.

HABITAT.—Colorado, Nebraska, Nevada, Kansas.

A distinct species easily recognizable by the strigate transverse mottling of primaries, entirely different from anything else in the group.

Carneades sponsa Smith.

1887. Smith, Proc. U. S. Nat. Mus., x, 457, *Agrotis*.

Very dark gray, the lines and ornamentation obsolete. The lines apparently geminate; t. a. line wavy; others not traceable. The ordinary spots are just sufficiently indicated to prove them of ordinary size and shape. Secondaries fuscous. Beneath paler, more fuscous gray, with a darker common line and discal spot. Head and thorax concolorous; collar with a median distinct black line.

Expands 32^{mm}; 1.25 inches.

HABITAT.—Washington.

A single ♀ specimen. The species is much like *perfusca*, but differs by the distinct black line of collar and the somewhat shorter, more obtuse primaries. The ground color also is a distinct gray rather than fuscous, and I have no question as to the specific distinctness of this form.

Carneades cogitans Smith.

1890. Smith, Trans. Am. Ent. Soc., XVII, 46, *Agrotis*.

General color ashen gray with a slight luteous tint. Head and thorax unicolorous; collar with a median transverse black line. Primaries in some specimens with fine blackish powderings, usually very even and smoothly colored without shadings or contrasts of any kind. Basal line in a fully marked specimen geminate, distinct on costa and traceable to the basal dash; in other specimens it is entirely obsolete. T. a. line geminate, the two lines equally distinct, strongly oblique outwardly and outcurved in the interspaces; sometimes almost entirely obsolete. T. p. line single, fine, crenulate, strongly outcurved over cell, and then almost parallel with the outer margin; in some specimens nearly obsolete, but generally traceable. S. t. line usually entirely wanting, rarely indicated by a vague dusky shading. A series of black terminal lunules. A distinct narrow longitudinal basal line to the t. a. line, beyond which the claviform is more or less indefinitely marked with a few black scales. Orbicular concolorous, slightly ovate, usually distinctly outlined in black, sometimes with a preceding black line, sometimes with a narrow line connecting it with the reniform. The reniform is inwardly well defined

by a curved black line, outwardly vague and indefinite, but usually traceable. Secondaries in the male pearly with a smoky tinge; in the female somewhat darker. Beneath white, powdery, with a variably distinct outer line and discal spot to all wings.

Expands 38–44^{mm}; 1.50–1.75 inches.

HABITAT.—California (Neumoegen).

Four specimens ♂ and ♀ are before me, no two of which are alike and which yet vary very slightly. The transverse lines are more or less obsolete, and the concolorous ordinary spots with their narrow black outline and markings are somewhat variable in shape and in their relations to each other. In type of marking there is a curious resemblance to *clandestina*, but the coloration and wing form are quite different. The thoracic tufting is not distinct, but is well indicated. The vestiture is rather loose.

Carneades hollemani Grt.

1874. Grt., Can. Ent., VI, 156, *Agrotis*.

Fuscous, more or less irrorate or strigate with white; costal space usually distinctly white; the terminal space is darker, strongly indented on some veins, 3 and 4 particularly, by white streaks. A distinct basal black streak, invading the cell and surrounding the white confluent, somewhat bottle-shaped, ordinary spots, claviform narrowly outlined with black. All transverse lines obsolete. Secondaries fuscous. Beneath paler, powdery, with indefined discal spots. Head and thorax concolorous; collar with a broad black shade.

Expands 31–36^{mm}; 1.20–1.40 inches.

HABITAT.—California; Arizona; Colorado.

A uniquely-marked species, resembling *lagena* of an entirely different group. The confluent ordinary spots, combined somewhat more gourd than bottle-shaped, and the white strigate maculation is entirely unique in the structurally allied species. The anterior tibia is less heavily armed at tip than most species of the group. It somewhat resembles *insertans* of the preceding group, but differs in the group characters.

Carneades atristrigata sp. nov.

Ashen gray, black powdered; collar with a black transverse line. Primaries heavily black powdered, all the transverse maculation obsolete. Orbicular elongate, narrow, fused with the small, upright reniform, also all the normal maculation absent. A paler shade runs from the end of the cell to the apex, and veins 3 and 4 are white marked rly to the margin, lightening that region. The fringes are cut with te. Secondaries white, with a broad, soiled outer margin.

Expands 30^{mm}; 1.20 inches.

HABITAT.—Northwest British Columbia.

The ordinary spots are small and scarcely distinct. The specimen is

a poor one and badly rubbed, and would not have been described but that it was a male, with the affinities so distinct as to render its recognition certain should other specimens be turned up.

Carneades biclavis Grt.

1879. Grt., Bull. Geol. Surv., v, 206, *Agrotis*.
1882. Grt., Ill. Essay 53, Pl. i, f. 12, *Agrotis*.

Color of primaries pale yellowish gray. Ordinary spots fused; the white orbicular lying on the cell and entering the upright reniform, which is more angulate and less bent than in *lagena*, and centrally stained with ochreous; the ordinary spots edged with black, except superiorly. A black basal dash extends into the long, whitish and prominent claviform, finely edged with fuscous. Median lines obliterate. S. t. line indicated by a curved series of interspaceal black marks. Veins inconspicuously and finely marked in white. Secondaries pure white. Beneath white, slightly fuscous on the cell. Thorax whitish gray.

Expands 31^{mm}; 1.25 inches.

HABITAT.—Arizona.

This species is unknown to me in nature, but its resemblance to *hollemani* is so marked that it can be referred nowhere else. Mr. Grote fortunately gives antennal structure of the ♂ which makes the reference more positive.

Carneades perpolita Morr.

1876. Morr., Proc. Bost. Soc. Nat. Hist., xviii, 237, *Agrotis*.
1878. Lint., Ent. Cont., iv, 123, *Agrotis*.

Deep shining blackish brown, transverse lines obsolete, ordinary spots concolorous, outlined by narrow black lines; variable in shape and occasionally connected or even confluent. Secondaries smoky fuscous, paler at base. Beneath smoky, the costal and outer margins of both wings darker. A distinct discal lunule. Head and thorax concolorous.

Expands 34–37^{mm}; 1.35–1.50 inches.

HABITAT.—Northern, Eastern, and Middle States, Maine, New York.

A very simply marked species, and once sectionally placed entirely unmistakable. I have the type, which is the largest specimen I have seen, and which has a distinct brown tint, less evident in the other specimens. It seems rare, and most of the specimens seen by me have come either from Mrs. Fernald or from Mr. Hill.

Carneades fumalis Grt.

1873. Grt., Buff. Bull., i, 98, *Agrotis*.
1878. Grt., Bull. Geol. Surv., iv, 174, *Agrotis*.
permunda Morr.
1874. Morr., Proc. Bost. Soc. Nat. Hist., xvii, 163, *Agrotis*.

Dark ash-gray, unicolorous; transverse lines distinct, apparently simple. T. a. line outwardly oblique, curved between veins, and be-

defined by a narrow deep black line. Secondaries white, toward the margin powdered with a few blackish scales. Beneath, primaries smoky, powdery; an evident discal dot; secondaries white, along costal margin powdered with black; a blackish powdery discal lunule. Head and thorax concolorous.

Expands 34–37^{mm}; 1.35–1.50 inches.

HABITAT.—Canada, Middle and Eastern States, west to California.

Distinguished by the almost uniformly black primaries and white secondaries. From dark forms of *pastoralis* in which the maculation is obsolete, this species is distinguished by the white secondaries, and the much shorter, more stumpy primaries. The species is a very recognizable one, and not uncommon locally.

Carneades atomaris Smith.

1890. Smith, Trans. Am. Ent. Soc. XVII, 47, *Agrotis*.

Head, thorax and primaries deep smoky or blackish brown. Palpi darker at sides, collar with a tip of luteous scales, thoracic crest with an admixture of hoary scales. Primaries with a luteous shading through the centre of the wing. All the maculation obscure, indistinct, yet all traceable. Basal line marked on costa only by a geminate black spot. T. a. line geminate, sometimes traceable through the cell, somewhat outcurved between veins and with a long outcurve below the internal vein. T. p. line geminate, marked on costa, evenly outcurved over reniform; inner line finely crenulate, outer scarcely marked, except by the slightly paler included shade. S. t. line paler, interrupted, sometimes almost obsolete. Claviform present, outlined in black. Orbicular round, moderate in size, very indistinctly outlined. Reniform rather large, normal in form, slightly more leaden black, not very definitely outlined. Secondaries (♂), pure white, a narrow dusky marginal line. Beneath white, powdery, with an interrupted outer line and discal spot to all wings.

Expands 31–35^{mm}; 1.25–1.40 inches.

HABITAT.—California (Neumoegen. Collection U. S. National Museum).

This seems the California representative of *velleripennis* which is also said to occur there. A large series in the Museum collection is all referable to this species. I shall not be at all surprised, however, if it prove but a geographical race of the Eastern form. The ground-color is more luteous and powdery, and the maculation is more distinct than in its ally.

Carneades texana Grt.

1863. Grt., Proc. Ent. Soc. Phil. II, 273, pl. 6, f. 2, *Agrotis*.
1881. Grt., Papilio, I, 127 *et* 153 ? = *segetum*.
1883. Grt., Papilio, III, 176, an. sp. dist. *segetum*.

ous to red brown; rather evenly colored, markings usually pres- ough very variably distinct, and never greatly contrasting. Me-

dian lines geminate. T. a. line nearly upright, roundedly angulate between veins. T. p. line parallel with outer margin, somewhat paler. S. t. line very indefinitely marked by the darker terminal space, sometimes entirely obsolete. Claviform wanting, or but faintly marked. Orbicular concolorous, round, narrowly defined. Reniform large, dusky, slightly constricted at middle and marked by a slightly paler annulus. Secondaries, whitish to yellowish fuscous. Beneath powdery, with somewhat darker discal spots. Head and thorax concolorous.

Expands 40–44^{mm}; 1.60–1.75 inches.

HABITAT.—Texas and Arizona.

A large species, not difficult of recognition, though variable in color. The wings are rather large, the outer margin oblique. The species has been doubtfully referred as synonymous with *segetum*, with which it has little indeed in common. *Segetum* is a very distinct species allied in markings to *messoria*, the antenna, however, very distinctly bipectinate, according to my arrangement close to *ypsilon*. I have seen no American specimens of *segetum*, and do not believe that such exist.

Carneades gagates Grt.

1875. Grt., Can. Ent. VII, 68, *Agrotis*.
1880. Grt., Bull. U. S. Geol. Surv. VI, 162, *Agrotis*.

Red brown, the transverse maculation obsolete. Median lines indicated by geminate spots on the costa. S. t. line pale, narrow, irregular, sometimes only marked by the somewhat darker terminal space. Ordinary spots normal in size and shape, pale ringed, blackish. Secondaries, fusco-luteous, paler toward base; the veins and a discal lunule darker. Beneath, powdered with reddish and black, all wings with an evident discal spot. Head and thorax concolorous.

Expands 37–40^{mm}; 1.50–1.60 inches.

HABITAT.—Colorado, California.

Very readily distinguished by the brown color, the darker ordinary spots and obsolete transverse lines. Except in the depth of groundcolor I have noted no appreciable variation.

Carneades citricolor Grt.

1880. Grt., Can. Ent. XII, 154, *Agrotis*.
1880. Grt., Bull, Geol. Surv. VI, 160, *Agrotis*.
1883. Grt., Can. Ent. XV, 26, *Carneades*.

Lemon yellow, terminal space and anteapical costal patch dusky, fuscous or brownish. Transverse lines variably distinct, geminate. T. a. line oblique, curved between veins. T. p. line about even with outer margin, slightly lunate between veins. S. t. line very irregular, limiting the dark terminal space. A row of small terminal dots. Claviform wanting. Orbicular dusky indefinite, more or less completely obsolete. Reniform large, dusky, indefinite, but tending to become inferiorly

defined by a narrow deep black line. Secondaries white, toward the margin powdered with a few blackish scales. Beneath, primaries smoky, powdery; an evident discal dot; secondaries white, along costal margin powdered with black; a blackish powdery discal lunule. Head and thorax concolorous.

Expands 34–37^{mm}; 1.35–1.50 inches.

HABITAT.—Canada, Middle and Eastern States, west to California.

Distinguished by the almost uniformly black primaries and white secondaries. From dark forms of *pastoralis* in which the maculation is obsolete, this species is distinguished by the white secondaries, and the much shorter, more stumpy primaries. The species is a very recognizable one, and not uncommon locally.

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Head, thorax and primaries deep smoky or blackish brown. Palpi darker at sides, collar with a tip of luteous scales, thoracic crest with an admixture of hoary scales. Primaries with a luteous shading through the centre of the wing. All the maculation obscure, indistinct, yet all traceable. Basal line marked on costa only by a geminate black spot. T. a. line geminate, sometimes traceable through the cell, somewhat outcurved between veins and with a long outcurve below the internal vein. T. p. line geminate, marked on costa, evenly outcurved over reniform; inner line finely crenulate, outer scarcely marked, except by the slightly paler included shade. S. t. line paler, interrupted, sometimes almost obsolete. Claviform present, outlined in black. Orbicular round, moderate in size, very indistinctly outlined. Reniform rather large, normal in form, slightly more leaden black, not very definitely outlined. Secondaries (♂), pure white, a narrow dusky marginal line. Beneath white, powdery, with an interrupted outer line and discal spot to all wings.

Expands 31–35^{mm}; 1.25–1.40 inches.

HABITAT.—California (Neumoegen. Collection U. S. National Museum).

This seems the California representative of *velleripennis* which is also said to occur there. A large series in the Museum collection is all referable to this species. I shall not be at all surprised, however, if it prove but a geographical race of the Eastern form. The ground-color is more luteous and powdery, and the maculation is more distinct than in its ally.

Carneades texana Grt.

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1881. Grt., Papilio, I, 127 *et* 153 ? = *segetum*.
1883. Grt., Papilio, III, 176, an. sp. dist. *segetum*.

Luteous to red brown; rather evenly colored, markings usually present though very variably distinct, and never greatly contrasting. Me-

dian lines geminate. T. a. line nearly upright, roundedly angulate between veins. T. p. line parallel with outer margin, somewhat paler. S. t. line very indefinitely marked by the darker terminal space, sometimes entirely obsolete. Claviform wanting, or but faintly marked. Orbicular concolorous, round, narrowly defined. Reniform large, dusky, slightly constricted at middle and marked by a slightly paler annulus. Secondaries, whitish to yellowish fuscous. Beneath powdery, with somewhat darker discal spots. Head and thorax concolorous.

Expands 40–44^{mm}; 1.60–1.75 inches.

HABITAT.—Texas and Arizona.

A large species, not difficult of recognition, though variable in color. The wings are rather large, the outer margin oblique. The species has been doubtfully referred as synonymous with *segetum*, with which it has little indeed in common. *Segetum* is a very distinct species allied in markings to *messoria*, the antenna, however, very distinctly bipectinate, according to my arrangement close to *ypsilon*. I have seen no American specimens of *segetum*, and do not believe that such exist.

Carneades gagates Grt.

1875. Grt., Can. Ent. VII, 68, *Agrotis*.
1880. Grt., Bull. U. S. Geol. Surv. VI, 162, *Agrotis*.

Red brown, the transverse maculation obsolete. Median lines indicated by geminate spots on the costa. S. t. line pale, narrow, irregular, sometimes only marked by the somewhat darker terminal space. Ordinary spots normal in size and shape, pale ringed, blackish. Secondaries, fusco-luteous, paler toward base; the veins and a discal lunule darker. Beneath, powdered with reddish and black, all wings with an evident discal spot. Head and thorax concolorous.

Expands 37–40^{mm}; 1.50–1.60 inches.

HABITAT.—Colorado, California.

Very readily distinguished by the brown color, the darker ordinary spots and obsolete transverse lines. Except in the depth of ground-color I have noted no appreciable variation.

Carneades citricolor Grt.

1880. Grt., Can. Ent. XII, 154, *Agrotis*.
1880. Grt., Bull, Geol. Surv. VI, 160, *Agrotis*.
1883. Grt., Can. Ent. XV, 26, *Carneades*.

Lemon yellow, terminal space and anteapical costal patch dusky, fuscous or brownish. Transverse lines variably distinct, geminate. T. a. line oblique, curved between veins. T. p. line about even with outer margin, slightly lunate between veins. S. t. line very irregular, limiting the dark terminal space. A row of small terminal dots. Claviform wanting. Orbicular dusky indefinite, more or less completely obsolete. Reniform large, dusky, indefinite, but tending to become inferiorly

enlarged. Secondaries, pure white. Beneath, pure white. Primaries powdered with gray toward apices, with a distinct discal dot. Head and thorax concolorous.

Expands 35–36mm; 1.40–1.45 inches.

HABITAT.—Colorado, Utah, Arizona.

Very easily recognized by the bright lemon-yellow color of primaries and the pure white secondaries of both sexes. It scarcely needs reiteration that Mr. Grote's reference of the species to *Carneades*, as a distinct genus, was based upon ignorance of the variation of structure peculiar to the genus.

The vestiture is entirely hairy.

Carneades misturata Morr.

Luteous, with a variable sprinkling of black scales; veins, especially the median, marked with white scales. Transverse lines distinct, though not contrasting, geminate. T. a. line outwardly oblique, moderately curved between veins. T. p. line somewhat paler, slightly crenulate, its course evenly parallel with outer margin. S. t. line pale, often marked only by the slight difference in color between s. t. and terminal spaces, the latter being darker; the line tolerably even; a row of dark terminal dots. Claviform faintly indicated. Ordinary spots concolorous. Orbicular small, round. Reniform somewhat constricted at the middle, dilated inferiorly. Secondaries, white; beneath, white. Primaries, powdered with gray outwardly, and with a distinct discal spot. Head and thorax concolorous.

Expands 34–35mm; 1.35—1.40 inches.

HABITAT.—Colorado.

Resembles *citricolor* in its pure white secondaries, but otherwise very distinct. It is hardly to be confounded with any species of this group. I can not find that Mr. Morrison has ever described this species. It does not seem to be in Mr. Grote's list, and the name in Mr. Tepper's collection, I believe, was probably a MSS. one, overlooked in publishing.

Carneades moerens Grt.

1883. Grt., Can. Ent., xv, 4, *Carneades*.
1883. Grt., Papilio, III, 30, *Carneades*.

"Of a faded, rusty yellowish fuscous. Lines fuscous, double, rather indistinctly scalloped. Stigmata concolorous, the orbicular round, [illegible]ntral dark dot; the reniform indistinct, with an inferior stain. [illegible] space a little darker than the wing. Collar with a faint [illegible]orax like fore wings. The untufted abdomen yellowish. [illegible]gs pale, with diffuse pale fuscous s. t. shading; a mesial line. [illegible] pale, with a common faint line and rather long discal streaks."

[illegible]nds 31mm; 1.25 inches.

[illegible]ITAT.—Arizona.

The species is not unlike *pityochrous* in maculation and color, but has white secondaries. It is a close ally of *citricolor*, but with more the ground-color of *misturata*.

Mr. Grote, in establishing his genus *Carneades*, seems not to have been aware how large a proportion of the species of *Agrotis* shared the structural peculiaries attributed to this genus.

Carneades dolis Grt.

1880. Grt., N. Am. Ent., I, 91, *Agrotis*.

An even, pale ash gray, all maculation obsolete. The t. p. line only is evident, white, single, interrupted, somewhat lunate. The s. t. line is indicated by a few white scales and is apparently very irregular. Fringes of primaries with a yellowish line at base. Secondaries whitish fuscous, paler toward base; fringe white. Beneath, white, powdery, a distinct discal dot and incomplete transverse line on each wing. Head and thorax concolorous.

Expands 37 mm; 1.5 inches.

HABITAT.—Colorado.

Another species with uniformly gray primaries and yet not to be confounded with the rather unusually numerous forms with wings almost or quite as evenly colored. About every group has a species with uniformly pale gray primaries, and yet even without reference to the structural differences each has a habitus so peculiarly its own that there is but little danger of confusion.

Only the unique type of the species in Mr. Hulst's collection is thus far known to me.

Mr. Butler says this species is indistinguishable from the *Chera birivia* Hbn., which occurs in the Alpine regions of Europe; but I can scarcely accept this conclusion without closer comparison than Mr. Butler seems to have made in the preparation of his paper.

Carneades scandens Riley.

1869. Riley, first Rept. Ins. Mo., 76, pl. 1, f. 5 and 7, *Agrotis*.
1874. Riley, sixth Rept. Ins. Mo., 6, *Agrotis*.
1875. Grote, Buff. Bull, II, 306=*muraenula*.
1875. Harv., Buff. Bull, III, 73, pl. 3, f. 4, an sp. dist.
1881. Riley, Gen. Index and Suppl. to Mo. Rept., 75, *Agrotis*.
1881. Grt., Papilio, I, 127 = *messoria*?.
1882. Riley, Papilio, II, 43, an sp. dist.
1883. Saund., Fruit Insects, 107, f. 105, *Agrotis*.

Ash gray, with various additions of yellow or red, changing the tone of ground color considerably. Transverse lines marked by geminate costal spots, else obsolete. S. t. line prominent, pale, interrupted, sinuate; marked by a preceding dusky shade, varying from fuscous to carmine, red brown. Orbicular, often entirely obsolete, more usually distinguishable as a rounded spot of the shade with which the gray base is suffused. Reniform usually perceptibly defined, of the ordinary form and size, inferiorly with a dusky shade, else concolorous. Secondarie

whitish with a double outward dusky shade, and a dusky discal spot. Beneath whitish, powdery, each wing with a faint discal spot and incomplete common line. Head and thorax concolorous. Thoracic vestiture, hairy.

Expands 29–37^{mm}; 1.15–1.50 inches.

HABITAT.—East of Rocky Mountains.

A very variable species in the shade with which the gray ground color is suffused. A remarkably large and handsome specimen from Utah is shaded with a rich carmine. Eastern specimens are, as a rule, smaller and more yellow in color than western examples. Mr. Grote has made very persistent efforts to get this species into the synonomy somewhere, but without any remarkable amount of success heretofore.

The early stages have been described by Professor Riley.

Carneades choris Harv.

1876. Harv., Can. Ent., VIII, 37, *Agrotis*.

Grayish fuscous; rather evenly sprinkled with dark scales, the tint very even and smooth in appearance; veins marked. Transverse lines rather broad, distinct, geminate, the included space paler. T. a. line outwardly oblique, very slightly wavy; t. p. line parallel with outer margin, rather even; s. t. line, narrow, pale, interrupted, its course sinuate. Claviform outlined. Ordinary spots distinct; orbicular round, moderate; reniform well sized, inferiorly somewhat enlarged. Secondaries whitish with dusky external line. Beneath whitish, powdered with gray, a distinct discal lunule; primaries with a dusky transverse line.

Expands 35–37^{mm}; 1.40(♀)–1.50(♂) inches.

HABITAT.—Colorado, Nevada.

There is considerable difference between the sexes of this species; the ♂ is paler, the transverse lines unusually approximate; s. t. line subobsolete; ordinary spots paler; the ♀ is darker, the transverse lines normally separated; s. t. line distinct, ordinary spots annulate with pale, else concolorous. This is a perfectly distinct and well-marked species, entirely unlike any other described form.

The specimens before me do not quite agree with what Dr. Harvey says of the species. His type is a ♂, and, compared with the example before me, the latter has the t. p. line more evidently marked and the orbicular is hardly elongate, nor the reniform narrow. Still I do not think I have a distinct species.

Carneades remota Smith.

1890. Smith, Trans. Am. Ent. Soc., XVII, 48, *Agrotis*.

General color a pale, carneous gray. Palpi blackish at sides, else head and thorax immaculate, concolorous. Primaries with a reddish suffusion apparent in the median space, and the terminal space dusky. Basal line geminate, distinct, brown. T. a. line geminate, incomplete, slightly

outcurved in the interspaces. T. p. line indistinctly geminate, as a whole well exserted over the reniform and thence rather evenly oblique to the inner margin; inner-part of line fine, crenulate, outer line represented by venular dots distinct only below vein 5. S. t. line indefinite, irregular, forming an outward curve on veins 3 and 5, and again near apex; relieved by the dark terminal space. Claviform small, concolorous, incompletely outlined. Ordinary spots paler ashen gray; orbicular outlined in black, oblique, somewhat irregular oval. Reniform large, kidney-shaped, narrowly pale lined, incompletely outlined inferiorly, outwardly with a pale, more yellowish blotch. A very narrow, interrupted, terminal line. There is a slightly deeper shade of reddish between the ordinary spots, but nothing like a distinct dark shading. Secondaries soiled whitish, with a darker outer margin. Beneath, primaries fuscous, with paler powdery outer and costal border. Secondaries paler, powdery, with an incomplete outer line and a diffuse discal spot.

Expands 35^{mm}; 1.40 inches.

HABITAT.—Sierra Nevada, California (McGlashan).

This is perhaps nearest to *choris*, but quite distinct from it. The maculation is more distinct than in any other member of the group so far as the spots are concerned and approaches the *tessellata* group, without, in the specimens before me, raising any question as to the propriety of referring the species here.

Carneades pitychrous Grt.

1873. Grt., Buff. Bull. I, 82 *Agrotis*.
personata Morr.
1876. Morr., Proc. Bost. Soc. N. H., XVIII, 238, *Agrotis*.
1880. Grt., Can. Ent. XII, 187, pr. syn.

Ocher yellow, to dark, somewhat bluish gray shaded with fuscous. Median and terminal spaces darker; costa in the more deeply colored specimens gray. Transverse lines variably complete, often subobsolete, sometimes very distinct, geminate; t. a. line upright, obtusely angulated between the veins; t. p. line very even, parallel with outer margin. S. t. line pale, usually rather evenly sinuate, sometimes marked with a preceding darker shade, rarely slightly indented on veins 3 and 4. Claviform usually indicated, rarely complete. Ordinary spots usually well defined, orbicular in pale specimens sometimes indefinite, but usually paler than ground color, reniform, always defined, paler than ground color, inferiorly darker. Often the outer third of median space is perceptibly darker than the other portion and sometimes there is a distinct dark shade in the cell, between the spots. Secondaries dusky to blackish, paler toward base; beneath whitish; primaries through center darker; a variably distinct common line and a dusky discal dot. Head and thorax concolorous.

Expands 31–35^{mm}; 1.25–1.40 inches.

HABITAT.—Canada and United States east of the Mississippi.

A common and variable species difficult to characterize except by a description of individuals. Common to all forms is the pale somewhat discolorous reniform, the inferior portion dusky; the general difference in shade of s. t. and terminal space is also constant, as is the slighter difference in shade in the median space itself. About every other character varies. The extreme pale form is generally larger, the lines obsolete, and a tendency to a pale longitudinal shade through the middle of the wing; this I consider the typical *pitychrous* form. The other extreme is smaller, the colors dark, the differences in shade decided, transverse lines complete; this is the *personata* of Mr. Morrison, the type of which is before me. Intergrades of all shades and sizes occur, and usually in these intermediate forms the costa is distinctly gray. As a rule the ♂ is paler and the secondaries are dirty white, darker outwardly. The thoracic vestiture is very strongly intermixed with scales. This species has been taken by me in some numbers on golden-rod in September, usually late in the afternoon—from 3 to 6 p. m. I do not remember taking it at Sugar.

Carneades infracta Morr.

1875. Morr., Proc. Bost. Soc. Nat. Hist., XVIII, 115, *Agrotis*.

Fusco-luteous, median and terminal spaces darker. Median lines geminate, distinct. T. a. line upright, but little curved between veins; t. p. line with a wide outward angulation over cell; incurved beneath. An evenly marked exterior shade from apex to inner margin just inside the s. t. line; the latter pale, narrow, and unusually irregular and strongly sinuate, its course mostly through the dark terminal shade. Ordinary spots concolorous with pale portions of wing, well defined; orbicular large, round; reniform moderate, outer side strongly incurved at middle. Claviform outlined, small. Secondaries uniform pale yellowish fuscous. Beneath pale, powdery, with common dark line and discal spot. Head and thorax concolorous.

Expands 28^{mm}; 1.12 inches.

HABITAT.—Colorado, Texas.

A small species with narrow primaries; not unlike some forms of *pitychrous;* but the very irregular s. t. line will serve to separate this form.

Carneades luteola Smith.

1887. Smith, Proc. U. S. Nat. Mus., x, 457, *Agrotis*.

Luteous, with a reddish shade, and somewhat irrorate with black; a darker shading to outer portion of median space; entire terminal space dark. Transverse lines geminate. Basal line evident. T. a. line slightly oblique outwardly and hardly wavy. T. p. line with outer parts distinct near costa only; inner portion distinct, fine, evenly crenulate. S. t. line concolorous, preceded by a dusky shade, its course very even; the line itself narrow, and somewhat remote from outer margin. Clavi-

form obsolete; orbicular small, round, concolorous; reniform somewhat indefinite, inferiorly shaded with dusky. Secondaries dirty white, outwardly dusky. Beneath pale, powdery, a reddish tinge along costa; a common outer dark line and distinct discal spot. Head and thorax concolorous.

Expands 31^{mm}; 1.25 inches.

HABITAT.—Arizona.

A sordid, indefinitely marked species, distinct, however, from the nearly allied species; from *infracta* it differs by the even s. t. line, and very even t. p. line. From the *personata* form of *pitychrous* it differs by the concolorous ordinary spots and very small orbicular; the median space is not darker and the s. t. line is farther from the margin than in *pitychrous*.

Carneades serricornis Smith.

1887. Smith, Proc. U. S. Nat. Mus., x, 458, *Agrotis*.

Reddish ocherous, powdery; s. t. line with a distinct preceding dark shade; terminal space incompletely dusky. Basal and t. a. lines geminate; the latter slightly oblique, outwardly curved between veins. T. p. line punctiform, geminate, the dots venular, small. S. t. line very distinct, slightly paler, but emphasized by the preceding dark shade; its course irregularly sinuate. Claviform wanting; orbicular obsolete, very faintly pale ringed; reniform dusky, lunate, obsoletely pale ringed. Secondaries whitish, outwardly dusky. Beneath pale, powdered with reddish and gray; an indefined discal dot on each wing. Head and thorax concolorous, vestiture mixed.

Expands 33^{mm}; 1.30 inches.

HABITAT.—Southern California.

Obviously distinct from anything else in the group; recognizable by the reddish shade to primaries, the very distinct s. t. line and lunate dusky reniform. The primaries are comparatively shorter and somewhat broader than any other species except perhaps *tetrica*.

Carneades tetrica Smith.

1887. Smith, Proc. U. S. Nat. Mus., x, 458, *Agrotis*.

Gray over reddish luteous, color very even; all maculation indistinct; lines geminate. T. a. line upright, very even. T. p. line parallel with outer margin, also remarkably even. S. t. line somewhat paler, very faintly indicated, sinuate. Claviform wanting, orbicular large round, concolorous, marked with black scales; reniform inferiorly dusky, indefinite, rather large in size. Secondaries dusky, paler toward base. Beneath pale, powdery, with discal lunule on all wings. Head and thorax concolorous; vestiture mixed.

Expands 35–37^{mm}; 1.4–1.5 inches.

HABITAT.—Texas, Nevada.

The wings are rather wider than most species of the group. The very even color and the remarkably even median lines will serve to identify this form which conflicts with none at all allied to it in shape of primaries.

The Nevada specimen in Mr. Tepper's collection is somewhat darker than those from Texas, and the maculation is still more completely obsolete.

Group MESSORIA.

Anterior tibiæ spinose, the terminal armature heavy; the member itself somewhat abbreviated, flattened and broad toward tip. The front full, tuberculate, the projection centrally depressed, or knob-like and roughened, granulate. The thorax is moderate, usually with an indefinite posterior tuft, occasionally with a divided anterior crest, never entirely untufted. The vestiture is entirely hairy in some species, mixed with flattened scales in others. The antennæ of the male are serrate, the joints strongly bristled. Primaries moderate, the apices at most rectangular and often somewhat produced. The distinctive feature characterizing the group is a distinct dark shade line through the median space, and the species grouped by this character, though colorational merely, are closely allied. The genitalia are all of the same bifurcate type; the lower branch is stout, straight, more or less tapering to the tip, variable in length in the species; the upper branch is more slender, subcylindrical, curved, usually shorter than, but occasionally exceeding the inferior branch in length. The variation in this structure is so decidedly one of degree rather than kind, that the figures must be left to explain the small apparent distinctions.

The group is divisible into two series, well distinguished at the extremes, but closely approaching at the middle; yet there is little difficulty in most cases in properly referring a species even though it is impossible for me to express the difference as briefly as I should like.

The first series, of which *bostoniensis* may be considered typical, is characterized by almost entirely hairy vestiture of thorax, never forming a distinct divided tuft, but gathered usually into an indistinct tuft posteriorly. The species are of moderate, or large size, the colors generally based on a shade of gray with various admixtures of yellow or red; the apices of primaries are produced, the outer margin oblique.

The maculation in the majority of species is indistinct, the median shade being often the most prominent feature. The ordinary spots are obsolete and indefinite except in *extranæ* and *trifasciata*, which, however, well agree in wing form with the typical species. The secondaries except in the two species above cited, and *comosa* and *bifasciata*, are white in the male, dusky in the female. The four species last cited are the aberrant ones of the series. The two former, however, as already stated have the wing-form, while *comosa* has the vestiture entirely hairy and *bifasciata* has the ordinary spots obsolete, the transverse lines simple.

Of the second series *messoria* is typical. The vestiture is very strongly intermixed with scales usually modified into a distinct, anterior divided tuft. The wings are more equal, the outer margins not so oblique, on the whole, less trigonate. The secondaries are never white in either sex. The maculation of primaries is usually well marked, the t. p. especially, which is strongly crenulate. The ordinary spots are usually very distinctly outlined and well sized, and where that is not the case, the dark color of primaries, the resemblance in form and other maculation to *messoria* is so striking that hesitation is not often necessary in placing a species.

In the subgroup *bostoniensis*, the typical species is remarkable for the dark color of primaries, and the blackish secondaries of the female.

Caenis, of which *muscosa* is a synonym, has the gray of primaries suffused with reddish, and the transverse lines of the same color.

Medialis replaces the reddish by yellow or white, the lines similar, but evidently geminate.

Feniseca has the ground color a pale luteous, the lines still more evidently geminate and becoming crenate, showing an evident tendency to the next section.

Extranea is even darker in ground color than *bostoniensis*, with the wing form of *caenis* and the transverse lines and ordinary spots distinct.

Trifasciata resembles the preceding so much that I at first inclined to the belief that they were color varieties; but closer comparison shows them to be distinct. This species has the primaries distinctly red brown, the orbicular larger, and the reniform differently shaped.

Bifasciata is smaller than either of the preceding, and unique, not only in coloration, but also in the broad, black and closely approximated median lines. The ordinary spots are obsolete.

Comosa still more strongly resembles the *messoria* group, but has the vestiture entirely hairy, the ordinary spots obsolete; the color is reddish and the t. p. line is very strongly denticulated.

In the *messoria* series there are two very well marked divisions possible, based upon average size—a difference of about .20 inches or 5^{mm} separating them.

Of the larger species, three have a distinct claviform.

Messoria is dark gray or fuscous, all the maculation very distinct. There is some variation in ground color, but on the whole the species is so true to type, that once known it will scarce be again mistaken. Some species have a reddish shade similar to the next.

Rubefactalis has a distinct red cast to the primaries, a black shade preceding the s. t. line, and a broad, black transverse line on collar.

Fauna seems to follow most naturally, though, from the horrible condition of the type, it is as much guess-work as anything else to assign an exact position to the species, and the type is the only specimen I have seen. The orbicular is irregular and the claviform linear, acute at tip. The ground color is pale red brown,

Pleuritica comes close to *messoria* but has a peculiar rusty yellowish tint to primaries which is characteristic. The resemblance to *pityokrous* which Mr. Grote emphasizes in his description I entirely fail to see. The species does not appear in the synopsis as I had not recognized it when that was written and have no specimens at hand now to place it properly. The remaining species of the larger series lack the claviform.

Brunneigera is close to *rubefactalis* in appearance, but lacks the claviform, and the ordinary spots are indistinct.

Incallida is a smooth even bluish ash gray in color, the median shade upright, very broad, distinct, diffuse, contrasting; the secondaries of the female blackish.

Lutulentus is luteous in ground color, the median shade narrow, vague, indefinite; secondaries of female luteo-fuscous.

Annulipes is a whitish gray, powdery form with a very prominent, curved narrow median shade.

Murdocki is one of the handsomest of our species. The basal and subterminal spaces are a bright rusty red or yellow, the median space a fine blue gray more darkly shaded outwardly. It is unique in appearance, and easily recognizable.

Quinquelinea is a simply-marked, fuscous gray species of rather even color, with simple black transverse lines, differing thus obviously from all the other members of the subseries. The remaining species of the group are smaller than any of the preceding; not so much absolutely, but habitally, seeming slighter in most cases.

Friabilis is a very dark form in which all the markings of *messoria* are present, sometimes quite distinctly. The general tint is more blue gray where *messoria* is fuscous, but otherwise the species might be considered as a dwarfed form.

Fuscigera is a still smaller, paler gray, the transverse lines broad, very distinct and somewhat approximate.

Orbicularis is a paler, somewhat longer winged species, in which the median lines, in contrast with the preceding, are widely separated.

Micronyx is a very short-winged, robust species, of the typical *messoria* color and general style of maculation, but the lines are indistinct and the orbicular is unusually large, gray.

Intrita is well marked; equally robust and short winged as the preceding, the color is a mixture of rust red and black, the lines distinct, geminate, the included space pale; t. p. line unusually even. As a whole, the species of each little group are closely allied, and yet each affords one or more distinctive characters, the knowledge of which renders specific recognition easy.

SYNOPSIS OF SPECIES.

e hairy, thorax with basal tuft only.
daries, at least of ♂, white; primaries gray to yellow.
naries very dark gray; median shade line the only distinct maculation,
BOSTONIENSIS.

Primaries carneous gray; maculation as before ..... CÆNIS.
Primaries yellowish gray; transverse lines more evident ..... MEDIALIS.
Primaries pale luteous; transverse lines geminate, distinct ..... FENISECA.
Secondaries in both sexes dusky; colors variable.
Ordinary spots distinct.
Primaries dark gray; reniform narrow ..... EXTRANEA.
Primaries red brown; reniform large, kidney-shaped ..... TRIFASCIATA.
Ordinary spots obsolete, not distinct.
Ferruginous and black; transverse lines single, broad, even, unusually approximate ..... BIFASCIATA.
More uniformly reddish; transverse lines normally distant, t. p. strongly crenulate ..... COMOSA.
Vestiture scaly or mixed; thorax with divided anterior tuft.
Moderately large species; the primaries trigonate, of moderate width.
Claviform present.
Color dark gray; all maculation distinct; collar with an indistinct dusky line, ... MESSORIA.
Color reddish; transverse line of collar distinct black ..... RUBEFACTALIS.
Color reddish; collar concolorous, orbicular elongate, irregular ..... FAUNA.
Claviform wanting.
Transverse lines geminate.
Basal and median spaces not contrasting in color.
Terminal space not darker, median shade diffuse, transverse lines very distinct, color reddish to gray, orbicular nearly obsolete, BRUNNEIGERA.
Terminal space and shade accompanying s. t. line distinctly blackish.
Median shade distinct, upright, very broad, distinct, diffuse, contrasting.
Ground color bluish ash gray, smooth; secondaries ♀ blackish, INCALLIDA.
Median shade narrow, vague, indefinite.
Ground color luteous, secondaries, ♀ luteo-fuscous ..... LUTULENTA.
Median shade very prominent, distinct, curved, rather narrow. Color reddish gray, powdery ..... ANNULIPES.
Basal and s. t. spaces ferruginous, contrasting with the ash gray median space ..... MURDOCKI.
Transverse lines single, color fuscous gray ..... QUINQUELINEA.
Smaller species.
Wings narrower, more equal, the costa somewhat more convex; body rather slight.
Very dark ash gray, all maculation like *messoria*, rather indefinite. FRIABILIS.
Lighter, more fuscous gray; transverse lines very distinct, somewht approximate ..... FUSCIGERA.
Luteous gray, orbicular whitish, transverse lines unusually distant, ORBICULARIS.
Wings short and wide, form robust.
Color and maculation like *messoria*, but indistinct; orbicular large, gray; reniform obsolete ..... MICRONYX.
Blackish over ferruginous; maculation distinct; transverse lines pale; t. p. lines unusually even ..... INTRITA.

Carneades bostoniensis Grt.

1874. Grt. Proc. Ac. Nat. Sci. Phil., 1874, 203, *Agrotis*.
1876. Harv. Buff. Bull., III, 74 pl. 3, fig. 7, *Agrotis*.

Very dark ash-gray, the lines and ordinary spots obsolete. S. t. line darker, sinuate, usually distinct. The somewhat curved median shade

is also distinct and crossing, the reniform is somewhat darker at that point. Secondaries ♂ white, ♀ black. Beneath pale, powdered with blackish; a distinct discal lunule, and an imperfect extra discal line.

Expands 37–41^{mm}; 1.50–1.65 inches.

HABITAT.—Middle, Eastern, and Northern States, Canada.

Easily recognized by the almost uniform dark ash-gray color. The difference in color of secondaries in the sexes is unusual, and not paralleled to the same extent in the genus. The vestiture is woolly, long.

Carneades cænis Grt.

1879. Grt. N. Am. Ent., I, 44, *Agrotis*.
muscosa Grt.
1883. Grt. Can. Ent., XV, 26, *Agrotis*.
1887. Smith, Proc. U. S. Nat. Mus., X, 460, pr. syn.

Gray, suffused with reddish; the ordinary spots concolorous, very illy defined. Transverse lines usually obsolete; in pale specimens distinct, red-brown, single. T. a. line upright, with an outward curve below vein 1.; t. p. line very even, parallel with outer margin; s. t. line pale, accompanied by a darker reddish shade. The median lines marked at costa with distinct geminate spots; median shades very distinct with a slight outward curve; deeper brown in color. This shade is distinct, even when all other maculation is obsolete. Secondaries ♂ white, ♀ dusky. Beneath pale, powdery primaries darkest. An indefinite discal lunule.

Expands 37–44^{mm}; 1.50–1.75 inches.

HABITAT.—Colorado.

A very pretty and well-marked species: *muscosa* Grote, of which I have the type, is based on a dark specimen in which only the median shade line is distinct. It is a ♀, and in all the females the maculation tends to become obsolete.

Carneades medialis Smith.

1887. Smith, Proc. U. S. Nat. Mus., X, 459, *Agrotis*.

Grayish white to ocher yellow, more or less irrorate with black scales; the transverse lines diffuse, powdery, dark, geminate; s. t. line also rather broad, diffuse; all the lines even; ordinary spots dusky, not defined, traceable; the usual median dark shade is distinct in most specimens. Secondaries ♂ white, ♀ dusky; beneath white, sparsely powdered with gray; indefinite gray discal spots and common line.

Expands 37–40^{mm}; 1.5–1.6 inches.

HABITAT.—Texas.

Seems not uncommon in Texas and is a very distinct species. It was in the Belfrage collection named *muraenula*, but is a very different species. The ♂ specimens seem inclined to pale yellowish, giving the insect a cursory resemblance to *citricolor*, than which it is much larger.

Carneades feniseca Harv.

1875. Harv., Buff. Bull., III, 74, pl. 3, f. 6, *Agrotis*.
1875. Grt., List Noctuidæ, 25, *Agrotis*.

Grayish clay yellow; the transverse lines fuscous, moderately distinct, geminate; basal line evident; t. a. line upright or but slightly oblique; but little angulate between veins; t. p. line crenulate, nearly parallel with outer margin; s. t. line diffused, indefinite; ordinary spots concolorous, illy defined; size and shape much as in the preceding species; claviform faintly indicated in some specimens. The median shade is distinct, diffuse. Secondaries ♂ white, ♀ dusky; beneath as in the preceding species.

Expands 34–38^{mm}; 1.35–1.55 inches.

HABITAT.—California.

Distinguished by its uniform luteous gray color, but otherwise in habitus very near to the preceding species.

Carneades extranea Smith.

1887. Smith, Proc. U. S. Nat. Mus., X, 459, *Agrotis*.

Dark ash gray; the transverse lines distinct; basal line evident; t. a. line faintly geminate, upright, scarcely lunate between veins; t. p. line even, outwardly curved over cell, inwardly slightly sinuate to hind margin. The terminal space is somewhat darker shaded, relieving the concolorous, very irregular s. t. line. Median shade distinct, diffuse, outwardly shaded so as to reach the t. p. line and thus darken the outer third of median space. Ordinary spots concolorous, distinctly outlined; orbicular small, round; reniform elongate, upright, rather narrow; secondaries ♀ yellow fuscous, of ♂ unknown; beneath fusco-luteous, powdery, an indefinite common line and discal lunule, darker.

Expands 37^{mm}; 1.5 inches.

HABITAT.—Montana.

A single ♀ specimen only in Mr. Tepper's collection. It is readily distinguished from all the others of the group by the dark gray color, the distinct ordinary spots, and the outwardly darker median shade. The insect has a casual resemblance to the species of *Ammaconia* both in maculation and wing form.

Carneades trifasciata Smith.

1887. Smith, Proc. U. S. Nat. Mus., X, 460, *Agrotis*.

Deep red brown, slightly irrorate with bluish gray; the transverse lines black. Basal line evident. T. a. line rather remote from base, single, upright, slightly irregular. T. p. line about parallel with outer margin, single, not very even in width, somewhat powdery. S. t. line punctiform pale, very even. Median shade darkening cell between ordinary spots, approximating t. p. line inferiorly and connected with it

at inner margin. Claviform evident, very small. Ordinary spots large, orbicular round, not entirely defined, powdered with gray; reniform kidney shaped, outlined with black, the sides well marked with yellowish scales. Secondaries ♀ fuscous, ♂, ♀. Beneath, smoky, powdered, with reddish gray; an inconspicuous common darker line.

Expands 37mm; 1.5 inches.

HABITAT.—Mount Hood.

A single ♀ specimen in Mr. Tepper's collection. The species is well defined, and easily recognized by the color alone.

Carneades bifasciata Smith.

1887. Smith, Proc. U. S. Nat. Mus., x, 460, *Agrotis*.

Ferrugineous at base, outwardly shading into blackish. Transverse lines broad, single, black, approximate. Basal line evident. T. a. line evenly oblique. T. p. line with a wide outward curve over cell, then running about parallel to outer margin. Median shade even, distinct, from costa at inception of t. p. line to hind margin at termination of same line; its course straight. Ordinary spots obsolete; traceable, but so faint and indefinite as not to be easily discerned. Secondaries reddish fuscous. Beneath fusco-luteous, powdery, with an indefinite common line and discal lunule.

Expands 35mm; 1.40 inches.

HABITAT.—Arizona.

A single ♂ specimen from Mr. Doll. The species is so well marked that no difficulty will be found in recognizing it. It is aberrant for the group in which I have placed it, but it fits nowhere else as well.

Carneades comosa Morr.

1876. Morr., Proc. Bost. Soc. N. H., XVIII, 238, *Agrotis*.

A rather pale brick red; the line blackish, stigmata obsolete. T. a. line upright, with three outward scallops, geminate. T. p. line single, parallel with outer margin, very strongly crenulate. The terminal shade is slightly darker and there is a similar shade preceding and relieving the concolorous sinuate s. t. line. Orbicular obsolete; reniform dusky, lunate; claviform wanting. The median shade is rather well defined upright, and nearly central both of wing and median space. Secondaries reddish fuscous. Beneath, powdered with reddish, an indefinite common line and discal spot. Head and thorax concolorous.

Expands 37mm; 1.5 inches.

HABITAT.—Colorado.

The type, a ♂, from Mr. Tepper's collection but yet sufficiently well marked to be rec entirely hairy and the insect in its preser to the *Pachnobia* group of the genus.

Carneades messoria Harris.

1841. Harris, Rept. Ins. Mass., *Agrotis*.
1862. Harris, Inj. Insects, Flint ed., 444, *Agrotis*.
1885. Riley, Ent. Amer., I, 176, *Agrotis*.
spissa Gn.
1852. Gn., Sp. Gen. Noct., I, 261, *Agrotis*.
1880. Grt., Bull. Geol. Surv., VI, 566, *Agrotis*.
1889. Butl., Trans. Ent. Soc. Lond., 1889, 379, pr. syn.
spissa Wlk.? nec. Gn.
1856. Wlk., C. B. Mus., Lep. Het., X, 327, *Agrotis*.
1877. Grt., Can. Ent., IX, 28, pr. syn.
lycarum‡ Grt.
1874. Grt., Can. Ent., VI, 155.
cochrani Riley.
1868. Riley, Prairie Farmer, July, 1868, *Agrotis*.
1869. Riley, First Rept. Ins. Mo., 75, *Agrotis*.
1874. Grt., Can. Ent., VI, 155, pr. syn.
1881. Riley, Supplt. and Index to Mo. Rept., 76, pr. syn.
1881. Grt., Papilio, I, 126, pr. syn.
1882. Riley, Papilio, II, 41, *Agrotis*.
repentis Grt. and Rob.
1868. Grt. and Rob., Trans. Am. Ent. Soc., I, 350, pl. 7, f. 58, *Agrotis*.
1873. Grt., Buff. Bull., I, 96, *Agrotis*.
1873. Grt., Buff. Bull., II, 53 = *cochrani*.
1881. Grt., Papilio, I, 126 = *messoria*.
balanitis Grt.
1873. Grt., Buff. Bull., I, 97, pl. 3, f. 14, *Agrotis*.

Dark ash gray with a luteous tint, to a somewhat smoky red brown; the transverse lines always distinct, black, the ordinary spots always defined. T. a. line variable in course and direction, and somewhat in the extent of the outward curves between veins. Usually the line is oblique. There are two small angulations above the median vein, and two wide outward curves below. T. p. line obsoletely geminate, crenulate, parallel to outer margin, or somewhat more upright. S. t. line pale, sinuate, marked by a more or less evident darker terminal and s. t. shade, the latter narrow. The median shade is distinct, crossing outer half of reniform and usually darkening it inferiorly, then running parallel and very close to t. p. line. Orbicular round, concolorous, distinctly and completely outlined by a narrow black line. Reniform large, kidney-shaped, the sides often relieved by yellowish scales. Claviform always obvious, and usually distinct, of variable size, but usually short. Secondaries, ♀ various shades of smoky to yellowish fuscous; ♂ paler, often whitish, with darker outer margins. Beneath powdery, with more or less evident common line and discal spots. Thorax concolorous, collar with a narrow black line.

Expands 31–40^{mm}; 1.25–1.60 inches.

HABITAT.—United States and Canada.

This species found from Atlantic to Pacific, and from Canada to the Southern States, is at once the most constant and one of the most

variable of our species. Usually the markings, and especially the ordinary spots, are constant and prominent, and give the insect a very distinctive appearance. Rarely the orbicular is ovate, and occasionally bottle shaped. A tendency in specimens from the West and Southwest is to become suffused with reddish, and some western specimens are among the largest seen. One form, paler than the typical specimens, and with a reddish tint, has been named *var. confracta.* by Mr. Morrison in Mr. Tepper's collection. I can not find, however, that the name was ever published. A form from Washington is decidedly reddish, so that it was marked "*rubefactalis*" by Mr. Grote; but I believe all these forms had better remain under the typical name until large and complete collections will warrant a sound judgment as to their specific or varietal standing. *Balanitis* Grt. was applied to a dark form, in which the t. p. line curves inwardly below cell, and the orbicular is small. Specimens before me have this peculiarity, and also the black lateral line of abdomen, mentioned by Mr. Grote. *Confracta* Morr., from the same locality, shows these peculiarities, which are not usually present in eastern specimens. A very large series before me proves the specific identity of all these forms.

Mr. Grote suggests that the *spissa* of Walker is not the species described by Guenée, and I am inclined to believe he is right. Mr. Butler, however, in the Trans. Ent. Soc. London, for 1889, positively refers *spissa* Gn. to *cochrani* Riley, which = *messoria* Harr. On this latter point I can say that I have seen Harris' types in the collection of the Boston Society of Natural History, and there is no doubt whatever of the identity of the name with the species now current under it. To bring Guenée's idea of *spissa* before the student I copy Mr. Grote's translation, which is sufficiently accurate:

"*Agrotis spissà* Guen., Noct., I, 261.

"This greatly resembles *crassa*, but the species is maller (35^{mm}), of a grayish-brown testaceous, the veins darker and relieved by a slightly paler ground, especially the median and its last branch; markings like *crassa*, but there is a great disproportion between the two stigmata; the t. p. line forms a dash entering below the fourth inferior nervule, and on the inner margin, below the submedian vein, it is elongated in such a way as to touch the top of the mark formed by the extra basal line; the cuneiform marks of the s. t. line are more regular and more equal; the hind wings are darker and more uniform.

"Am. Sept. Coll. Bdv. Two bad specimens."

Carneades pleuritica Grt.

1875. Grt., Check List, 1875, 47, *Agrotis.*

"♂ allied in structure and color to *pityochrous*, larger (40^{mm}), without the costal or other pale shading, of a uniform gray with a yellow brown staining. Orbicular spherical, gray, black ringed, with dark center, larger than in its ally; claviform short, narrow, without the continu-

ous streak; t. p. less faintly indicated; all the lines geminate; terminal space darker than the wing. Hind wings whitish at base, with broad vague border; fringes white tipped, interlined, whereas in *pitychrous* they are pure white. Thorax concolorous with primaries; patagiæ marked with white on the shoulder. Beneath pale with faint outer lines and discal marks; a common dark terminal marked line more distinct on hind wings. There are no cuneiform or vein markings before the s. t. line of primaries in this species, which is as large as *messoria* and resembles dark specimens of *pitychrous* in color. Canada."

This species puzzled me for some time. To the kindness of Mr. Thaxter I finally owed sight of the species, and found it closely related *messoria* rather than *pitychrous*, but with the peculiar yellowish tinge described by Mr. Grote. I have seen it from Maine, New Hampshire, and northern New York.

Carneades rubefactalis Grt.

1880. Grt., Bull. Geol. Surv., VI, 154, *Agrotis*.

Brick-red, suffused with blackish through the median space, a prominent, even dark shade preceding s. t. line. Lines geminate, black, included space of ground color; their course essentially like those of *messoria*. Ordinary spots concolorous, small; orbicular round; reniform excavated at outer side. Claviform faintly marked. Collar with a broad black line. Secondaries pale fuscous. Beneath essentially as in *messoria*.

Expands 33–35^{mm}; 1.30–1.40 inches.

HABITAT.—Washington, Colorado.

This species is closely allied to *messoria*, but distinct by the small orbicular and reddish color of thorax and primaries. The broad black line on collar is also distinctive, though in *messoria* there is a similar but less distinct line.

Carneades fauna Morr.

1876. Morr., Proc. Bost. Soc. Nat. Hist., XVIII, 237, *Agrotis*.

Sordid reddish luteous, somewhat irrorate with black; the transverse lines indistinctly marked, geminate, included space concolorous. T. a. line outwardly oblique and curved between veins. T. p. line crenulate sinuate, nearly parallel as a whole with outer margin. S. t. line obsolete. The median shade is diffuse, indefinite, darkening cell between ordinary spots. The latter are concolorous, completely defined; orbicular irregularly elongate; reniform upright oval, sides nearly parallel. Claviform outlined, narrow, somewhat elongate. Secondaries yellowish fuscous. Beneath, yellowish fuscous with somewhat darker discal lunules. Head and thorax concolorous. Vestiture strongly mixed with scales.

Expands 37^{mm}; 1.5 inches.

HABITAT.—California.

This is another of Mr. Morrison's famous types, from Mr. Tepper's collection. Mr. Morrison has distributed by all odds the most miserably preserved lot of specimens as types that has ever been my ill fortune to see. The present species, if a perfect specimen ever comes to hand, will require care in identifying.

Carneades brunneigera Grt.

1875. Grt., Buff. Bull., III, 80, *Agrotis*.
1880. Grt., Bull. Geol. Surv., VI, 260, *Agrotis*.

Grayish red to red brown; transverse lines distinct, blackish. Ordinary spots concolorous. Basal line evident, geminate. T. a. line distinct geminate, upright or slightly oblique, outwardly curved between veins. T. p. line crenulate, obsoletely geminate, its course sinuate. S. t. line concolorous, marked with a dark accompanying shade. Claviform wanting; orbicular entirely obsolete, or very faintly, hardly perceptibly outlined. Reniform also indefinite, often not traceable, but usually outlined, or at least distinct as a dusky lunule. The median shade is dusky, diffuse rather beyond the center of the m. space. Head and thorax concolorous. Secondaries fuscous. Beneath fuscous, powdery; a distinct darker transverse line and discal spot.

Expands 33–35^{mm}; 1.30–1.40 inches.

HABITAT.—California, Washington, Vancouver, Colorado, Louisiana.

The type from Vancouver is rather distinct red brown; a ♂ specimen from Colorado is nearly equal to the type in color. Three other specimens shade off into a distinct rather reddish gray, the maculation remaining tolerably alike. The obsolescence of the ordinary spots, especially the orbicular, compared with the distinctness of the transverse lines, is characteristic of the species.

Carneades incallida Smith.

1890. Smith, Trans. Am. Ent. Soc., XVII, 50, *Agrotis*.

General color pale ashen gray. Palpi brown at sides; a dusky line across the front; collar dark tipped. Thorax unicolored, concolorous. Primaries with slightly darker suffusion beyond the median shade. Basal line geminate, black, upright, lunulate, the outer line broad, the inner narrower and fainter. A broad black median shade, somewhat diffuse outwardly. T. p. line black, lunulate, geminate, the outer line distinct near costa only, a strong outcurve over reniform, and a slight incurve in the submedian interspace. S. t. line irregular, interrupted, pale, marked by a very distinct smoky preceding, and a somewhat less evident following shade. Claviform wanting, orbicular barely traceable, concolorous; reniform marked only by an indefinite dusky spot. Secondaries deep smoky brown. Beneath very dark smoky brown with white powderings along the costa, broader on secondaries. A broad diffuse outer band, distinct only through the paler parts of the wing.

Secondaries with a discal spot. Vestiture of breast ash-gray, tarsi and tibiæ black ringed.

Expands 37mm; 1.50 inches.

HABITAT.—Sierra Nevada, California.

This species has a casual resemblance to *munis*, *opipera*, or *dissona*, but is perhaps nearer to the Alpine *simplonia* than to any of our own species. It is very distinct from its associates in every respect. There is but a single female from Mr. Edwards' collection known to me.

Carneades lutulenta Smith.

1890. Trans., Am. Ent. Soc., XVII, 50, *Agrotis*.

General color a luteous gray; sides of palpi dusky, a dusky line extending from the eyes to the base of primaries; head and thorax else immaculate. Primaries slightly blackish powdered, more distinct along the inner margin, and darkening the terminal and outer part of s. t. space. Basal line geminate, not well marked. T. a. line geminate, outwardly slightly oblique, moderately outcurved in the interspaces, a long outcurve below internal vein; inner part of line obsolete, outer very distinct. T. p. line narrow, crenulated, parallel with the outer margin, inferiorly becoming indefinite; outer part of line marked only near costa and not continued as a series of venular dots. Median shade indefinite, diffuse, best marked between the ordinary spots, and with some difficulty traceable below. Beyond the t. p. line the s. t. space darkens to the outer margin interrupted by the very fine, pale, irregular, and partly obsolete s. t. line. No dark terminal line or lunules, a pale yellow line at base of fringes. Claviform wanting. Orbicular round, pale ringed, not prominent, scarcely even distinct. Reniform large, very vague, not outlined, marked by a yellowish curved line, which constitutes the outer margining line, and by a slight lateral extension of the median shade. Secondaries smoky fuscous, outwardly somewhat darker. Beneath paler, more whitish, powdery, with an outer line and discal spot on all wings; primaries with disc fuscous and outer line incomplete.

Expands 34mm; 1.35 inches.

HABITAT.—Sierra Nevada, California.

Very closely allied to *brunneigera* Grote, with which it agrees in all structural characters and in the ornamental characters determining its reference to the *messoria* group. It differs in the pale ground color, the greater size of the ordinary spots and the distinct outer shade combined with the partly obsolete s. t. line.

Types, a male in the Rutgers College collection; others in collections of Hy. Edwards and U. S. National Museum.

Carneades annulipes Smith.

1890. Smith, Trans. Am. Ent. Soc., XVII, *Agrotis*.

General color ashen gray with a reddish shade, with blackish powderings. Palpi darker at sides, head somewhat pallid in front, collar with a very vague transverse line composed of dark powderings. Thorax evenly and not heavily powdered. Primaries with the dark powderings becoming more prominent outwardly, slightly suffusing the outer part of median space and becoming most prominent as a heavy smoky brown shade before the s. t. line, the terminal space dusky but not so dark as the outer part of s. t. space. Basal line apparently single, brown, not very distinctly marked. T. a. line geminate, evenly outcurved, slightly irregular; the outer part of the line is distinct, brown, rather broad, the inner vague, not well marked superiorly, but easily traced through the lower part of its course. Median shade very distinct, brown, rather definitely limited, very nearly parallel with the t. a. line. T. p. line distinctly geminate, rather widely outcurved over reniform and slightly incurved below; inner line distinctly crenulate, outer line somewhat vague except through costal region. S. t. line pale, somewhat diffuse and very even, starting from the pale apical space. Claviform wanting. Orbicular and reniform slightly paler, not outlined, very vague and indefinite, at first sight apparently wanting. Secondaries smoky whitish, somewhat iridescent. Beneath whitish, powdery, primaries darkest and with trace of an outer line; secondaries more powdery along costa and without outer line or discal spot.

Expands 29^{mm}; 1.16 inches.

HABITAT.—Oregon.

A very distinct species of which I have only one ♀ specimen in good condition. It has all the characters of the *messoria* group, and according to the tabular arrangement comes nearest to *brunneigera*. It is, however, decidedly smaller than that species and the color is more gray; the prominent median shade, and the dusky terminal parts of the wing are distinctive. The tarsi are ringed with brown, the legs also of the same grayish white as the underside.

The type I have deposited in the U. S. National Museum.

Carneades murdocki Smith.

1890. Smith, Trans. Am. Ent. Soc., XVII, 49, *Agrotis*.

Head and thorax a rather bright yellowish red, almost ferruginous, without mark or spot. Primaries with basal and subterminal space of the same red brown color as thorax. Median space bright bluish gray, outwardly dark shaded. Terminal space dusky. Basal line faintly marked. T. a. line geminate, very even, with an even, rather small outward curve; inner line brown, outer line broader, black. T. p. line geminate, even, outwardly curved over reniform, slightly incurved

beneath; inner line black, distinct, outer line indefinite, incomplete, brown. S. t. line marked by the contrast between the evenly dark terminal space and pale s. t. space, its course irregular. A dusky costal shade in s. t. space before apex, leaving a paler apical spot. A pale line at base of fringes. Claviform wanting. Orbicular large, round concolorous, faintly outlined by a pale ring. Reniform large, kidney-shaped, inferiorly dark filled, obscured by the median shade which crosses the spot and then runs rather diffusely and close to the t. p. line, darkening the outer part of median space. Cell between the spots also dusky. Secondaries whitish, soiled, with a faint reddish suffusion. Beneath pale, powdery, disc of primaries darker; an outer line and discal dot to all wings.

Expands 30^{mm}; 1.20 inches.

HABITAT.—Northwest British Columbia, Utah.

This very handsome species is readily recognized among its congeners by the strong contrast between the blue-gray median and reddish yellow or rusty red basal and s. t. spaces. It has all the characters of the *messoria* group, but is unique among them all. The specimen now before me is from Mr. Neumoegen. I received it some time since from Mr. Edwards, who had it, I think, from Utah. Some years since I received the first specimen from the late Capt. D. H. Murdock, Fort Thornburgh, Utah, and this specimen is now in the U. S. National Museum. From Captain Murdock I received many good species, and it is matter for extreme regret that so good a collector in so fine a locality should have lost his life so unfortunately.

Carneades quinquelinea Smith.

1890 Smith, Trans. Am. Ent. Soc., XVII, 49, *Agrotis*.

General color fuscous gray. Head concolorous, collar with a dusky central line; thorax concolorous. Primaries evenly colored, the transverse lines blackish. Basal line distinct, single. T. a. line distinct, upright, very slightly angulate; median shade line distinct, broad, very irregular. T. p. line single, narrow, crenulate, its course as a whole very nearly parallel to the outer margin. S. t. line consisting of a narrow, dark shade line followed by some pale scales relieving and defining the same; an interrupted, very narrow terminal line. Secondaries and abdomen pale smoky fuscous. Claviform wanting, ordinary spots barely traceable, concolorous, reniform inwardly marked by a small black dot. Beneath pale, powdery fuscous, with an outer line and discal spot on all wings.

Expands 35^{mm}; 1.40 inches.

HABITAT.—Sierra Nevada, California.

This simply marked form is allied in appearance to *tristicula* or *fusca*, but with the characters of the present group so far as they can be made out from the single female before me. The single transverse lines are distinctive in this series.

Carneades friabilis Grt.

1875. Grt., Can. Ent., VII, 187, pl. I, f. 5, *Agrotis*.

Even dull fuscous to ash gray, the markings usually indefinite but on the whole exactly like *messoria*. Secondaries and underside also like *messoria*.

Expands 31–33^{mm}; 1.25–1.30 inches.

HABITAT.—New York, Maine, Canada, California.

Very closely allied to *messoria*, but darker, ash gray, more evenly colored, the transverse lines and ordinary spots often scarcely evident, and the size perceptibly smaller.

Mr. Grote curiously failed to recognize the true relationship of the species by comparing it with *bostoniensis*, with which its resemblance is decidedly remote.

The species seems rare in the Eastern States, but, if my identification is correct, the species is more common in California. A series of specimens received from Messrs. Edwards and Neumoegen, from California, were at first regarded as a local form of *messoria*. Mr. Neumoegen, however, pointed out a specimen named *friabilis* by Mr. Grote in his collection, which was evidently the same as the Californian series. The western specimens are more ash gray than *messoria*, and have a less amount of the fuscous admixture than eastern specimens.

Carneades fuscigera Grt.

1874. Grt., Can. Ent., VI, 155, *Agrotis*.

Even dull fuscous gray, the lines blackish, more or less distinctly geminate. Ordinary spots outlined, concolorous. Basal line evident. T. a. line rather remote from base, upright, curved between veins, the outer line most distinct, broad. T. p. line sinuate, lunulate, broad. The curve over cell wide; inward curve below less evident. S. t. line sinuate, slightly paler. Claviform very faintly indicated. Orbicular round, rather large. Reniform constricted at middle, more or less incompletely outlined. Secondaries smoky, paler at base; an indefinite extra discal line and lunule reflected from beneath. Beneath whitish, powdery, a very distinct broad dusky common line and discal lunule. Head and thorax concolorous.

Expands 29–32^{mm}; 1.15–1.30 inches.

HABITAT.—California.

Distinguished by the rather small size and the very even color.

Carneades orbicularis Smith.

1887. Smith, Proc. U. S. Nat. Mus., X, 460, *Agrotis*.

Luteous gray; transverse lines distinctly geminate, dark fuscous. Ordinary spots defined, paler. Basal line defined, marked by black points beneath median vein. T. a. line upright, slightly denticulate; the included space marked with gray. T. p. line even, very narrowly

crenulate, its course parallel with, and unusually close to outer margin, making the median space very broad. S. t. line narrow, somewhat paler, its course sinuate; a terminal row of black dots. The median shade is not well marked and is central to the median space. Claviform concolorous, not distinctly outlined. Orbicular round, pale gray. Reniform moderate, kidney-shaped, annulate with gray, centered with ground color. Secondaries pale yellowish fuscous. Beneath whiteish, powdered, a darker discal lunule. Head and thorax concolorous.

Expands 32^{mm}; 1.25 inches.

HABITAT.—Nevada.

A well-marked species, with rather narrow wings; it is easily distinguished by the widely separated median lines and pale orbicular. A single ♀ is in Mr. Tepper's collection.

Carneades micronyx Grt.

1878. Grt., Bull. Geol. Surv., IV, 171, *Agrotis*.

Primaries fuscous, with a whitish gray cast; transverse lines geminate, indistinct. T. a. line upright, very slightly waved. T. p. line faintly lunulate, about parallel with outer margin. S. t. line concolorous, narrow, sinuate, shaded each side with darker fuscous. Claviform wanting. Orbicular large, round, gray. Reniform concolorous, incompletely outlined. The median shade darkens the cell between stigmata and runs rather close to t. p. line beneath median vein. Secondaries dark fuscous. Beneath pale fuscous, with common, even, subdentate line and discal marks. Collar with a distinct black transverse line.

Expands 30^{mm}; 1.20 inches.

HABITAT.—California.

This species is very distinct; the body is heavy, the primaries comparatively short, obtuse. The obsolescent maculation, the dark ground color, and large round gray orbicular make a combination at once recognizable. Withall, its resemblance to *messoria* is striking.

Carneades intrita Morr.

1874. Morr., Proc. Bost. Soc. Nat. Hist., XVII, 164, *Agrotis*.
1875. Grt., Can. Ent., VII, 68, *Agrotis*.

Ferruginous, shaded with black. Transverse lines distinct geminate, included space paler. Basal line evident. T. a. line oblique, scalloped between the veins. T. p. line very even, parallel to outer margin. S. t. line narrow, somewhat indefinite, strongly sinuate. Claviform evident, concolorous. Ordinary spots pale ringed, centered with ground color, of normal size and shape. The dusky median shade darkens the cell between the ordinary spots, then curves under reniform and runs parallel with and close to the t. p. line. Secondaries yellowish fuscous, paler toward base. Beneath, primaries smoky, secondaries whitish,

both powdery, with incomplete common line and faintly marked discal lunule. Head and thorax dark; base of patagiæ at sides ferruginous

Expands 31–33^{mm}; 1.25–1.30 inches.

HABITAT.—Vancouver; California, Arizona.

A short winged species, readily recognizable by the peculiar rusty and black color and the very even pale t. p. line.

Group TESSELLATA.

Front full, tuberculate or roughened; anterior tibiæ spinose; antennæ of male serrate and bristled; thorax indistinctly or not at all tufted, rarely with a distinct anterior crest. Genitalia of the same type as in the other groups of the genus. The distinguishing feature of the present group is found in the ornamentation, and principally in the usually large, often pale, ordinary spots, and the black or other dark stained cell relieving them. Negatively there is no distinct median shade, and there are no obvious dentations crossing or indenting the s. t. line. In the more typical forms the primaries are perhaps a little broader and more trigonate than in the typical forms of the other groups; but this does not hold true of all the species.

As a whole the group is fairly well separable from the others of the genus, but some of the species show variations which may create doubt. Care is therefore necessary in placing single specimens of some forms, and the general descriptions of ornamental and color characters must not be too literally construed.

Whenever [illegible] questionable form should be compared with specimens of the group types, and if the relationship is then readily evident and the characters of color are not used to [illegible]

Of the species in hand here [illegible] is at once separable by the broad, even, pale gray transverse band. It is a large white-winged form and [illegible]

A small group of species of mountain or high northern habitat is [illegible] by specimens of great value of the names. Hairy vestiture and [illegible] These species have a distinctive habitus, and are also [illegible]

[illegible] and gray with black median space. The [illegible] form, [illegible] and [illegible] by [illegible] This is the species [illegible]

[illegible] by [illegible] and [illegible] but the transverse [illegible] by [illegible]

[illegible] by [illegible] The median [illegible] the [illegible] spots are large, [illegible]

[illegible] by [illegible] it [illegible]

All the other species of the group have distinctly geminate transverse lines. One series lacks all trace of a basal black dash, which in the other series is always distinct. The typical forms lack this basal dash.

Of this first series *euroides* is a narrow-winged form, bluish white in color, with the large ordinary spots prominently relieved by the black cell.

The other species vary from carneous gray to fuscous brown or blackish, all possible shades being represented.

The secondaries are dusky in both sexes of the following seven species:

Alticola is easily distinguished from all its allies by lacking all trace of a claviform. The species varies greatly in ground color, but is usually some shade of yellowish red. The maculation is very often scarcely traceable, and in such specimens the group characters are not notable and point rather to *pitychrous* than to *tessellata*. With a good series at hand the reference here is easy.

Rufula and *basiflava* are closely allied species which may eventually be merged into geographical forms of the same. In both the orbicular is incomplete superiorly and the basal space is paler. *Rufula* is the paler, yellowish red in color, median space darker, contrasting somewhat with the basal and s. t. spaces. *Basiflava* is altogether a darker, more powdery form. The basal space is not much paler, and the median and s. t. spaces are concolorous. The former is from New Mexico, the latter from British Columbia and Sierra Nevada.

Satis is red brown in color, the ordinary spots powdered with yellow, the cell usually not much darker between them. The lines are not relieved.

Rena is a carneous gray species, sometimes more reddish, without any distinct contrasts. The transverse lines are usually more or less obsolete, the ordinary spots rarely completely outlined, the space between them not much darker. Altogether a very inconspicuous though distinct species.

Insignata, under which term I include *declarata*, *campestris*, *decolor*, and *verticalis*, has the color smooth, even; the transverse lines sometimes very distinct; ordinary spots large, narrowly lunulate with yellow. *Campestris* is that form in which the color is uniform, dark, the transverse lines distinct. *Decolor* has the lines partly obsolete, the brown colors relieved in basal and s. t. spaces by luteous, sometimes contrasting quite strongly. *Verticalis* is more like *decolor*, but replaces the lighter shades by carneous gray, deepening to brownish in the darkened regions. The latter is a local form, found in Montana and Colorado, and is quite constant.

Tessellata is distinguished by rougher vestiture, the color not smooth and even, but coarse, powdery; the transverse lines are not so cleanly cut, nor the ordinary spots so well defined. The latter are powdered with gray.

Albipennis is like *insignata* in evenness of color and general appearance, and has been confused with it. It is, however, smaller, and the secondaries are white in the male, dusky in the female.

Spectanda and *pallipennis* have the secondaries white in both sexes. The former is a rather small, narrow winged form with very neat, sharply defined maculation, resembling *albipennis*. The latter has pale fuscous primaries with complete but very illy defined maculation; it is one of the characterless species which are with difficulty referred to an appropriate group, and which there may be difficulty in recognizing.

Basalis, *solitaria*, and *nostra* differ from all the preceding by longer wings with the apices of primaries more evident.

Basalis is a pale red brown, with the basal space gray; the ordinary spots are large and pale in color.

Solitaria is of much the same color, but the basal space is not pale, and the ordinary spots are small and yellow; the transverse lines gray.

The remaining species have an evident black dash at base of primaries.

Ochrogaster varies from yellow to bright red brown; the transverse lines obsolete; the primaries are long and narrow, subequal, and thus distinct from the remaining members of the series.

Two color divisions are indicated in the balance of the species; the first of various shades of brown, the costa usually paler; the second ash or darker gray, with somewhat longer primaries, apices more distinctly marked.

Idahoensis is dull fuscous brown, the costal region gray; ordinary spots also gray, distinct; orbicular oblique, oblong, open superiorly.

Furtivus is very like the preceding, but the orbicular is V-shaped, and there is a series of distinct sagittate spots preceding the s. t. line.

Westermani is allied, but is more sordid in appearance; the ordinary spots not so well defined, orbicular rounded, but incompletely outlined superiorly. In addition the costa is strongly convex where in *idahoensis* it is straight.

Obeliscoides has the transverse lines distinct, the costal region and ordinary spots whitish; reniform unusually large, contrasting; orbicular complete; s. t. line narrow, paler, rather even, costa arched.

Infelix is larger, has the costal region yellow, ferruginous, or gray; orbicular round, complete; reniform not unusually large; s. t. line defined only by the difference in color between s. t. and terminal spaces, preceded by a series of sagittate black spots; costa not arched. This is a distressingly variable species, becoming dull black in some specimens, without obvious maculation save the outlines of the ordinary spots, and then likely to be confused with *pastoralis*, from which, however, it is, I believe, distinct. Other specimens become lilac shaded and then resemble *perexcellens*.

Islandica is also allied to *obeliscoides*, but separable by the concolorous costal region and ordinary spots. The basal space is paler.

Divergens (*versipellis*) is more nearly allied to *tessellata*, but is very easily distinguishable by the white marked subcostal and median veins and the white powdered annuli of the ordinary spots.

Redimicula is very distinct by its generally dark color, very large and evenly pale gray ordinary spots, basal space gray above the black dash, and short, stumpy primaries.

Atrifera is a somewhat luteous form, the transverse lines indistinct, ordinary spots concolorous, cell incompletely dark.

Tesselloides and *silens* are the ash-gray species. The former is darker, the transverse lines are more evident, and the vestiture is coarser. The latter is pale, the transverse lines are obsolete, and the vestiture is smooth, even.

SYNOPSIS OF SPECIES.

Transverse lines distinct, broad, pale.....FERNALDI.
Transverse lines distinct, single, black; primaries dull ashen gray.
Basal dash present, collar black lined.
Median space darker; ordinary spots and transverse lines sharply defined, OPIPARA.
Unicolorous, pale luteous; transverse lines obsolete; ordinary spots indefinite, TRISTICULA.
asal dash and line of collar wanting.
Woolly clothing of breast pale.....MUNIS.
Woolly clothing of breast black.....DISSONA.
Transverse lines geminate variably distinct.
Basal dash of primaries wanting.
Color bright, bluish white, wings parallel, rather long.....EUROIDES.
Colors, reddish to brown, to blackish, wings trigonate, apices not evidently produced.
Secondaries in both sexes dusky.
Claviform wanting; color pale reddish.....ALTICOLA.
Claviform present.
Orbicular incomplete superiorly; basal space somewhat paler.
Color yellowish red, contrast between basal, s. t. and median space distinct.....RUFULA.
Color dull luteous brown, with black powderings; basal space but little paler; no contrast between s. t. and median spaces.....BASIFLAVA.
Orbicular complete.
Color red brown, rather even; ordinary spots yellow powdered; cell usually not much darker between the spots.....SATIS.
Color even, varying from carneous to reddish gray; no contrasts; lines usually more or less obsolete.....RENA.
Color gray to dark fuscous brown or blackish, even; median and terminal spaces darker, contrasting; ordinary spots large, concolorous, INSIGNATA.
Color red brown to blackish, rough, powdery; maculation less clear cut; ordinary spots powdered with pale scales.....TESSELLATA.
Secondaries of male white, of female dusky.
Primaries evenly colored, dark; ordinary spots large, dark; t. p. line obsolete.....ALBIPENNIS.
Secondaries white in both sexes.
Primaries luteous gray, even; the maculation distinct, clear cut..SPECTANDA.
Primaries sordid whitish, maculation all present but indistinct..PALLIPENNIS.

Color pale red or luteous brown, wings longer, apices more produced.
Basal space pale; ordinary spots large, pale.....BASALIS.
Basal space concolorous; ordinary spots small, yellow; transverse lines pale, SOLITARIA.
Color luteous brown; ordinary spots large; tuftings gray tipped; ordinary lines narrow, not pale.....NOSTRA.
Basal dash of primaries present.
Primaries elongate, subequal, color yellow to dark red brown; transverse lines obsolete, ordinary spots concolorous.....OCHROGASTER
Primaries shorter, more trigonate, apices rectangular.
Costa blue gray, ordinary spots gray; orbicular oblong, oblique, open superiorly, costa straight.....IDAHOENSIS.
As before; orbicular V-shaped; a series of distinct sagittate spots before s. t. line.....FURTIVUS.
As before; orbicular round, incomplete; costa convex; maculation obsolete, WESTERMANI.
Costal region and ordinary spots white, contrasting; reniform unusually large; wings wider, costa arched.....OBELISCOIDES.
Costal region and ordinary spots yellow to ferruginous, to lilac gray; size larger; costa less arched; wings narrower.....INFELIX.
Costal region and ordinary spots clay yellow, not contrasting; primaries more even, sub-parallel.....ISLANDICA.
Costa concolorous; subcostal and median veins white; ordinary spots ringed and powdered with white.....DIVERGENS.
Costal half of basal space, and the large ordinary spots bluish gray; primaries stumpy.....REDIMICULA.
Dull luteous; transverse lines obsolete; ordinary spots rather small.ATRIFERA.
Primaries long, trigonate, apices produced; colors gray.
Dark gray, powdery; ordinary spots paler; transverse maculation distinct, TESSELLOIDES.
Pale, whitish; ordinary spots concolorous; transverse maculation indistinct, SILENS.

Carneades fernaldi Morr.

1875. Morr, Proc. Ac. Nat. Sci. Phil., 1875, 429, *Agrotis*.
1882. Grt., Ill. Essay, 53, pl. 1, f. 11, *Agrotis*.

Fuscous brown, washed with lilac gray; transverse lines very distinct, even, geminate, the included space gray; the basal space most densely powdered with gray scales. T. a. line very oblique outwardly, its course very slightly sinuate; t. p. line nearly parallel to outer margin; the inferior portion of median space very narrow. S. t. line lilac gray, irregular; inwardly determinate, outwardly shading into a gray suffusion of the terminal space. Claviform small, outlined. Ordinary spots large, defined, powdered with gray; cell before and between the spots black. Secondaries dusky, a marked discal and terminal pale line. Beneath dusky, with an extra discal pale common line and darker discal spots. Head and thorax lilac gray.

Expands 37^{mm}; 1.5 inches.

HABITAT—Maine.

A very handsome species and so well marked that there can be no taking it. I have seen only the type in Mrs. Fernald's collection.

Carneades opipara Morr.

1874. Morr., Proc. Bost. Soc. N. H., XVII, 165, *Agrotis.*
1875. Morr., Psyche, I, 42, *Agrotis.*
1875. Grt., Psyche, I, 77=*islandica.*
1875. Morr., Psyche, I, 85, an. sp. dist., *islandica.*
1876. Grt., Psyche, I, 99=*islandica.*
1876. Grt., Stett. Ent. Zeit., XXXVI, 135=*islandica.*
1885. Smith, Ent. Amer., I, 15, an. sp. dist., *islandica.*
1885. Smith, Stett. Ent. Zeit., XLVI, 223, *Agrotis.*
labradorensis Stgr.
1881. Stgr., Stett. Ent. Zeit., XLII, 419, *Agrotis.*
1883. Moeschl., Stett. Ent. Zeit., XLIV, 117, *Agrotis.*
1885. Smith, Stett. Ent. Zeit., XLVI, 223 pr. syn.
islandica ‡ Auct.
1876. Grt., Stett. Ent. Zeit., XXXVI, 135, *Agrotis.*
1878. Pack., Bull. Geol. Surv., IV, 555, pl. f. 10, *Agrotis.*
1883. Moeschl., Stett. Ent., XLIV, 117, *Agrotis.*
1885. Smith, Stett. Ent. Zeit., XLVI, 223, pr. syn.

Ash gray, median space strongly and variably suffused with black; a costal patch in s. t. space dusky. Transverse lines distinct, single; t. a. line upright, very little waved; t. p. line finely crenulate, about parallel to the outer margin; s. t. line even, preceded by a series of sagittate black dashes. A basal black streak. Claviform distinct, black. Ordinary spots distinctly outlined, gray; reniform with a central dusky line. Orbicular variable in size, usually small; round. Cell filled with black. Secondaries dusky; a darker discal and terminal shade line and discal lunule. Beneath pale, with a distinct, broad, powdery, transverse line, and a distinct discal lunule on each wing. Head and thorax concolorous; collar with a broad black shade.

Expands 32–37^{mm}; 1.25–1.50 inches.

HABITAT.—New Hampshire, Mount Washington, Labrador.

Mr. Grote was correct in referring *opipara* and *islandica* Moeschl. (*nec* Stgr.) as synonymous. The error is Moeschler's, in failing to recognize the distinction between the forms, and Mr. Grote's for so positively condemning Mr. Morrison's species on insufficient grounds. Mr. Morrison was also correct in describing his specimen as distinct. The Labrador specimen before me is smaller, rather shorter winged, than the Mount Washington specimens, but not otherwise distinct. Unfortunately all are females, and I can not find in literature any description of a male. It is barely possible, therefore, that the species does not belong to this group.

Carneades tristicula Morr.

1875. Morr., Proc. Ac. Nat. Sci., Phil., 1875, 429, *Agrotis.*

Pale, somewhat luteous gray, the transverse lines obsolete; s. t. line indicated by a row of fuscous spots. A basal black dash. Ordinary spots concolorous, large, incompletely outlined; a triangular black spot before orbicular; a quadrate patch between the spots.

Secondaries pale, outwardly dusky. Beneath pale: discal lunules dusky, rather indefinite. Head and thorax concolorous; collar with a black band.

Expands 37mm; 1.5 inches.

HABITAT.—Maine.

Easily distinguished by its incomplete markings. The type which is before me is not fresh, and seems somewhat faded as well as a little rubbed: the lines are faintly traceable and are single; fresh specimens I think will have them fairly distinct.

Carneades munis Grt.

1879. Grt., North Am. Ent., I, 34, *Agrotis.*
sublatis Grt.
1880. Grt., North Am. Ent., I, 91, *Agrotis.*

Ash gray with faint lilac tinge; median space more or less evidently suffused with fuscous, forming an evident transverse shade line parallel with and close to t. p. line; cell very distinctly black, relieving the large concolorous ordinary spots. Transverse lines distinct, single; t. a. line upright and nearly straight to vein 1, then widely bent outwardly to inner margin; t. p. line evenly crenulate, parallel to outer margin. S. t. line tolerably even, preceded by a distinct dark shade. Claviform outlined, sometimes sending a spur almost across the median space. Reniform with a more or less evident dusky internal line. Ordinary spots seldom completely outlined. Secondaries yellowish fuscous. Beneath pale; a very distinct broad common line and lunate discal spot. Head and thorax concolorous.

Expands 34–37mm; 1.35–1.50 inches.

HABITAT.—Colorado, Nevada.

This species, by the presence of a distinct transverse shade across median space, conflicts somewhat with the diagnosis of the group; but the whole habitus and the distinct dark cell so evidently places it here that we had rather make it exceptional than associate it with species with which it otherwise bears no very close relationship.

The type of *sublatis*, a ♂, is before me. Mr. Grote in his description falls into the singular error of describing the antenna as simple. They are very distinctly serrate—brush-like, as Mr. Grote terms this structure. There is no doubt of the specific identity of the two forms.

Carneades dissona Moeschl.

1860. Moeschl., Wien Ent. Monatschr., IV, 365, pl. 9, f. 4, *Agrotis.*
1885. Smith, Ent. Amer., I, 14, *Agrotis.*
1885. Smith, Stett. Ent. Zeit., XLVI, 223, *Agrotis.*
rara Pack.
1868. Pack., Proc. Bost. Soc. Nat. Hist., XI, 38.

Pale ash gray with a lilac tint. Transverse lines not very distinctly marked; t. a. upright, tolerably even; t. p. very finely crenulate, par-

allel with outer margin; s. t. line even, marked with a preceding dusky shade; a distinct transverse shade parallel with and close to t. p. line. Claviform indistinct, rather long and narrow. Ordinary spots moderate, concolorous; reniform with dark, sometimes buff, central shade. Secondaries dusky fuscous. Beneath pale, powdery; a distinct discal lunule. Head and thorax concolorous.

Expands 33^{mm}; 1.30 inches.

HABITAT.—Labrador.

I have seen ♂ and ♀ specimens from Mr. Moeschler. Very closely allied to *munis*, but smaller; easily distinguished by the blackish woolly clothing of the underside; the same parts of *munis* white. There is a difference in wing form between the sexes, those of the ♀ being narrower, and some in maculation, the ♀ being somewhat more completely marked. The ♂ was sent by Mr. Moeschler sub. nom. *simplonia*, and was not recognized by its describer as belonging with the female type.

Carneades euroides Grt.

1874. Grt., Proc. Ac. Nat. Sci. Phil., 1874, 202, *Agrotis*.
perpura Morr.
1874. Morr., Proc. Bost. Soc. Nat. Hist., XVII, 164, *Agrotis*.

Bluish white, about the tint of New York City milk. Basal space somewhat powdered with black, a dusky shade through terminal space, and cell before and between ordinary spots, black. Transverse lines geminate; t. a. upright, outwardly curved between veins; t. p. lunulate, somewhat less oblique than outer margin; s. t. line marked by preceding black triangular spots. A lunate terminal line. A very faint dusky transverse shade. Claviform broad, concolorous, narrowly outlined. Ordinary spots very large, concolorous; reniform with a narrow, dusky central line. Orbicular open superiorly. Secondaries fuscous. Beneath white, powdery; disc of primaries smoky; a distinct lunate discal spot on secondaries. Head and thorax concolorous; collar with a broad black line.

Expands 37–40^{mm}; 1.5–1.6 inches.

HABITAT.—California, Washington.

A very distinct species; the primaries are rather narrow. The pale color, large ordinary spots, and black cell, will easily separate this from all allied forms.

Carneades alticola Smith.

1890. Smith, Trans. Am. Ent. Soc., XVII, 51, *Agrotis*.

General color a mixture of red and clay yellow, varying to a definite bright red-brown or deep brick-red. Collar with a dusky central line, not apparent in dark specimens. Primaries always with a darker shade before the s. t. line, and usually the terminal space also is darker. In fully marked specimens the maculation is as follows: Basal line geminate, indistinct, included space paler than ground color; t. a. line

geminate, slightly oblique, strongly outcurved between veins, included space paler; t. p. line very even, parallel with outer margin, geminate, inner line crenulate, fine, included space pale, outer line vague, often wanting; from this point the s. t. space usually begins to darken to the pale s. t. line, which is very irregular, sinuate, outwardly curved over veins 3 and 4, and again over veins 6 and 8, intervening inward angle quite sharp. Claviform wanting; orbicular round, or a trifle oblique, pale ringed, with concolorous, or somewhat paler center; reniform large, kidney-shaped, pale ringed, incompletely outlined inferiorly, where it is somewhat dark filled, outwardly pale marked; the cell between the ordinary spots is usually darker, sometimes black, and in such case in pale specimens a distinct, dark, median shade crosses the wing from that patch. From this complete maculation the variation is in the direction of obsolescence; the basal and t. a. lines are the first to go; then the t. p. line becomes indistinct, and the pale included space alone is sometimes seen crossing the wing; then this goes and only the s. t. line remains, and this is evident in all the specimens; the darker preceding shade is also permanent, but variable in intensity, while the terminal space may be either darker, concolorous with, or paler than the ground color. The ordinary spots are always traceable, but vary in the line of obsolescence. The most strongly modified specimen is dark brown-red, with all save the s. t. line lost, the preceding shade very slightly marked, ordinary spots concolorous, the pale defining line very narrow. Secondaries in the ♂ soiled whitish, with a narrow dusky outer border; in the ♀ fuscous. Beneath powdery, primaries more reddish, secondaries whitish, no outer transverse line, secondaries without distinct discal spot.

Expands 31–35^{mm}; 1.25–1.40 inches.

HABITAT.—Sierra Nevada, California.

A large series of this interesting species is before me, showing what I hope is the entire range of variation of the species which is a difficult one to place in a table by reason of its variability. It is very close to what I have determined at *satis* Harvey, but differs in having no claviform, in lacking the gray powderings of primaries, in wanting the black defining lines to the ordinary spots, and in lacking the common transverse line of the underside. From *rufula*, to which it is also allied, it differs in having the median space concolorous and the orbicular always complete. Single specimens of the species, with partly obsolete maculation, may be difficult to locate properly.

Types are with Messrs. Edwards and Neumoegen, and in the U. S. National Museum collection.

Carneades rufula Smith.

1897. Smith, Proc. U. S. Nat. Mus., x, 471, *Agrotis*.

Somewhat yellowish red brown; median space darker, red brown. Cell, except ordinary spots, still darker, more blackish. Transverse s geminate, included space pale. T. a. line oblique, outwardly

curved between veins. T. p. line finely and evenly crenulate, parallel with the outer margin. From this line, which is like the basal space, very pale yellowish red brown, the color becomes evenly darker to the outer margin, nowhere, however, as dark as the median space. S. t. line narrow, pale, interrupted, sinuate. A row of terminal dark lunules. Claviform moderate, incompletely outlined, pale. Ordinary spots pale with whitish annuli, moderate in size; the orbicular suboval, not completely closed superiorly. Head and thorax concolorous. Secondaries blackish. Beneath rusty, powdery, with broad, diffuse common line and distinct discal spot on all wings.

Expands 31^{mm}; 1.25 inches.

HABITAT.—New Mexico, 7,000 feet.

A single ♂ specimen in good condition from Prof. F. H. Snow. The species is very distinct and easily recognized by the very pale basal space and neatly defined, evenly darker median space.

Since the species was described I have seen a few specimens which indicate a degree of variability in the contrast between the median and basal spaces. One specimen is almost uniformly pale red, but the dusky cell still remained to mark its allies.

Carneades basiflava Smith.

1890. Smith, Trans. Am. Ent. Soc., XVII, 52, *Agrotis.*

Deep, dull luteous brown, with black powderings, varying to quite deep blackish brown. Collar concolorous, or sometimes head and collar paler with a ferruginous tinge, and with a variably evident dark transverse line, less distinct in the pale (♂) specimen, black in the dark (♀) specimen. Primaries with basal space paler, the contrast most marked in the male. Basal line distinct, black, angulate, geminate. T. a. line distinct, geminate, the inner line somewhat indistinct but not obsolete, outer line black; the course very even and nearly upright from costa to internal vein, then with a long outward curve to inner margin. A faint, diffuse, and indefinite median shade forms the dark shading between the ordinary spots. T. p. line evenly and not strongly curved over reniform, very slightly incurved below; the line is geminate, the inner crenulate, the outer very even; included space concolorous or with ashen powdering. S. t. space slightly paler; a narrow, indefinite, pale s. t. line, which is slightly sinuate and preceded by a series of somewhat triangular dark spots. A row of blackish terminal lunules. No basal dash or mark. The costa is slightly paler, but not at all discolored or contrasting. Claviform distinct but small, black bordered. Orbicular inwardly oblique, oval, not complete superiorly, black margined, slightly paler. Reniform of fair size, kidney-shaped, not complete inferiorly, black margined and with a paler annulus. The cell is darker, but not distinctly black between the ordinary spots. Second-

aries smoky, paler and more yellowish in the male. Beneath
smoky, primaries with an outer line marked on costal space only;
ondaries paler discally, with a small discal spot and an outer line
yond which the margin is darker.

Expands 29–30^{mm}; 1.16–1.20 inches.

HABITAT.—Northwest British Columbia.

This species is allied to *satis* and *rufula*. From the former it di
by the incomplete orbicular. It is a darker, shorter winged spe
with the cell more definitely dark filled. From *rufula* it differs in
dark color and the lack of the distinct contrast between the me
space and the basal and s. t. spaces. The orbicular is as in *rufula*,
the under side is much darker, with the maculation not marked.
specimens, ♂ and ♀, are before me, differing very decidedly in app
ance. The male is paler, the maculation more distinct, and the p
of the basal space is more evident. The female is darker through
the tendency along the costa and in the ordinary spots to a ciner
powdering, the contrast between basal and median space not
marked. The species is not a strongly marked one, but is distin
think. Though most difficult to separate from the species above na
it really gives the impression, in the ♀ more especially, of *tessel*
It can not well be that species, however, variable as it is. It is a
deal more likely eventually to turn out a variety of *rufula*.

Carneades satis Harv.

1876. Harv., Can. Ent., VIII, 36, *Agrotis*.

Red brown, powdered with gray; transverse lines geminate
outwardly oblique, curved between veins T. p. lunulate, outwa
curved over cell, inwardly beneath S. t. line sinuate, preceded
dusky shade or dark spots; terminal space a little darker. Clavi
outlined, concolorous. Ordinary spots large, concolorous; black rin
and marked with a few yellow scales. Secondaries fuscous. Ben
fuscous, powdery, with distinct discal spot and obsolete common
Head and thorax concolorous; collar with a black line.

Expands 28–32^{mm}; 1.12–1.28 inches.

HABITAT.—California, Nevada, Montana.

A small species, rather illy defined. The resemblance to the ty
forms of the group is obvious, but the cell is not so distinctly b
rather powdered with dark. Dr. Harvey's description is unus
poor and comparative with another species, itself described only
paratively. From Mr. Edwards' collection I have a specimen lab
satis and from Mr. Tepper's collection one so determined by Mr. G
Several other specimens agree with these, but none are entirely
the description. The type, I understand, came into Mr. Grote's ha
and his identification is probably correct and therefore here adopte

Carneades rena Smith.

1890. Smith, Trans. Am. Ent. Soc., XVII, 53, *Agrotis.*

General color varies from a very pale carneous gray to a distinct reddish gray; the change being rather one of intensity than color. Head and thorax immaculate, palpi dark at sides. Primaries with the maculation not strongly contrasting, transverse lines sometimes obsolete; in fully marked specimens basal line distinct, geminate, black. T. a. line very slightly outcurved, irregular, geminate; outer line blackish, broad, distinct; inner line faint and more even. T. p. line geminate; outer line punctiform, inner line narrow, crenulated, its course rather even, and not strongly outcurved over reniform. S. t. line pale, narrow, very slightly irregular, relieved by a distinct dark, rather narrow preceding shade. A narrow interrupted dark terminal line. This maculation may be wanting in part or entirely. One specimen lacks all but the merest trace of the t. p. line; usually the s. t. line remains distinct. Claviform small, incompletely outlined, in pale specimens entirely wanting. Orbicular large, round, slightly irregular, narrowly pale ringed, a black spot filling the space between orbicular and t. a. line and another dusky shade filling the interval to the reniform; the color of the included space is very slightly paler than ground color; reniform large, upright, kidney shaped, narrowly outlined in pale, with a leaden gray filling, becoming blackish inferiorly. These ordinary spots are constant in the series examined though the distinctness varies, as does also the color of the filling between them. Secondaries soiled white to pale fuscous, the difference not sexual. Beneath, primaries fuscous, powdery, pale at costa, with an outer transverse line visible only at costa and a large discal spot; secondaries much paler, powdery, with a distinct outer shade line and large discal spot.

Expands 31–33^{mm}; 1.25–1.32 inches.

HABITAT.—Sierra Nevada, California.

The series before me, by the kindness of Mr. Edwards, shows quite a long range of variation within comparatively narrow limits. There is little or no change in ground color nor in the relative position or course of the lines or spots, while the whole transverse maculation may be almost completely gone and only the ordinary spots remain. In structure it fully agrees with *tessellata* and *insignata*, and with the latter of these species it is most nearly allied, being closest to the form described as *verticalis* by Mr. Grote. It differs essentially from this, however, in the shape of the ordinary spots, and especially in not having any contrast whatever between median and s. t. space—a marked feature in all the *insignata* forms. Judging from the number of specimens sent by Mr. McGlashan the species is not uncommon.

Two specimens referable to this species in Mr. Neumoegen's collection, marked California, without indication of special locality, have the ground color a luteous brown or reddish, with a faint gray shade

over all, and the cell between the ordinary spots more distinc
Otherwise the maculation is practically identical, and I can
that we have here a distinct species.

Carneades insignata Wlk.

1856. Wlk., C. B. Mus., Lep. Het., x, 330, *Agrotis.*
1889. Butler, Trans. Ent. Soc., Lond., 1889, 379, *Agrotis.*
declarata Wlk.
1865. Wlk., C. B. Mus., Lep. Het. Suppl., xxxii, 663, *Mamestra.*
1882. Grt., Ill. Essay, 43, *Agrotis.*
1883. Grt., Proc. Am. Phil. Soc., xxi, 156, *Agrotis.*
1885. Saund. Can. Ent., xvii, 32, *Agrotis.*
1888. Butl., Trans. Ent. Soc. Lond., 1889, 379 pr. syn.
tritici ‡ Gn.
1852. Gn., Sp. Gen. Noct., i, 228, *Agrotis.*
1889. Butler, Trans. Ent. Soc., Lond., 1889, 379 pr. syn.
decolor Morr.
1874. Morr., Proc. Buff. Soc. Nat. Hist., xvii, 162, *Agrotis.*
1875. Morr., Can. Ent., vii, 214, *Agrotis.*
1877. Morr., Buff. Bull., iii, 212, *Agrotis.*
campestris Grt.
1875. Grt., Can. Ent., vii, 118, pl. 1, f. 6, *Agrotis.*
1875. Grt., Proc. Ac. Nat. Sci. Phil., 1875, 423, *Agrotis.*
1875. Morr., Can. Ent., vii, 214 = *decolor.*
1875. Grt., Can. Ent., vii, 227 = *decolor.*
1877. Grt., Bull. Geol. Surv., iii, 118, *Agrotis.*
1878. Grt., Bull. Geol. Surv, iv, 175, *Agrotis.*
1889. Butler, Trans. Ent. Soc., London, 1889, 379 pr. syn.
var. VERTICALIS Grt.
1880. Grt., Bull. Bklu. Ent. Soc., iii, 29, *Agrotis.*
1885. Smith., Can. Ent., xvii, 6 = *declarata.*

Ground color from carneous gray to deep blackish or brigh
brown; terminal space always, median space usually a sha
darker than other parts of wing; cell between ordinary spo
t. p. line black or blackish brown; lines geminate, variabl
and varying in course, especially t. a. line. S. t. line variabl
pale, sometimes only marked by the limit of the dark termi
Claviform distinct, outlined, variable in size and shape. Ordi
very large, concolorous, outlined in black, annulate with yell
Secondaries dusky to dark fuscous. Beneath powdery, v
shade, a more or less incomplete common line and discal lun

Expands 31–34^{mm}; 1.25–1.35 inches.

HABITAT.—Nova Scotia, Canada, northern United Stat
Rocky Mountains.

A very decidedly inconstant species. Thirty or more spec
before me, and except for the variety *verticalis* no two are
is difficult to describe such a species as this, which varies so
and even in maculation. The wings are comparatively rat
broad, trigonate, the apices rectangular. The ordinary spo
very large and distinct, contrasting against the dark

cell. This, the usually very distinctly geminate transverse lines and the smooth squammation, will ordinarily suffice to distinguish the forms of the species.

Verticalis is applied to a tolerably constant bright carneous gray form from Colorado and Montana; none of the other forms are well enough marked to receive separate designation.

The only species with which the present is likely to be at all confused are *tessellata* and *nigripennis*, and the differences authorizing those species are pointed out in the descriptions thereof.

The synonymy of the species as I have it at present is in compliance with Mr. Butler's references in the Transactions of the Entomological Society of London for 1889. There does not seem much room for error in so strongly marked a species. The distribution is wide, but does not seem to extend southward. The species occurs in northern New York, but I have not seen it from Long Island. It does not seem to be found in the Central States, but re-appears in the high Western plateaus.

Carneades lewisi Grt.

1873. Grt., Buff. Bull., I, 137, pl. 4, f. 10, *Pleonectopoda*.

"♂ Reddish purple brown, not unlike *Agrotis plecta* or *leucostigma* in general color, but more robust, and without the pale longitudinal shades on primaries. Transverse lines obliterate; median lines dark, narrow, faint; t. p. line sublunulate, projected opposite the cell, running evenly to internal margin. Ordinary spots large, concolorous, with a narrow, pale, powdery edging separated by the black, well defined shade which fills up the cell and is slightly apparent before the orbicular. Median shade apparent below the orbicular and approximate to the t. p. line. Subterminal line, pale. Terminal space duller, paler, less red than the rest of the wing; no terminal line, fringes concolorous. Hind wings pale, testaceous fuscous, silky, without marks above or below. Head and thorax reddish; feet pale dotted; abdomen a little darker than secondaries. Costal edge of primaries with anteapical pale dots, visible on the red-stained costal edge beneath. The forewings beneath are like secondaries without marks."

Expands 34 ^{mm}; 1.36 inches.

HABITAT.—Colorado. (Coll. T. L, Mead.)

In the description of the genus *Pleonectopoda* Mr. Grote well defines the characters of the *tessellata* group. There is thus no doubt of the position of the species which I am strongly inclined to believe a mere variety of *tessellata*. I have specimens agreeing perfectly with the description as to color, but all have the t. a. line perfectly distinct, and none are immaculate beneath. On these two points apparently rests the claim of this insect to rank as a species. It must be provokingly close to some of the reddish forms of *tessellata*, but may be entirely distinct.

Carneades tessellata Harris.

1845. Harris, Rept. Ins. Mass., *Agrotis*.
1869. Harris, Inj. Ins. Flint ed., 445, *Agrotis*.
1877. Grt., Bull. Geol. Surv., III, 118, *Agrotis*.
1882. Saund., Fruit Insects, 328, f. 340, *Agrotis*.
nubici Fitch.
1856. Fitch, 2d Rept. Ins. N. Y., 313, *Agrotis*.
1865. Fitch, 9th Rept. Ins. N. Y., 237-249, pl. 4, f. 2, f. 3, *Agrotis*.
1874. Grote, Can. Ent., VI, 118, pr. syn.
1878. Lintn., Ent. Cont., IV, 122, pr. syn.
nigricans: Riley.
1868. Riley, 1st Rept. Ins. Mo., 87, *Agrotis*.
atropurpurea Grt.
1877. Grt., Bull. Geol. Surv., III, 118, *Agrotis*.

Ash gray to dark red brown, irrorate with black, the vesti squammose. Transverse lines as in *insignata* but less distinc S. t. line usually distinct, yellowish, sinuate, often prec darker shade, the terminal space darker. Claviform fain Ordinary spots usually well sized, powdered with gray or bicolor often small, round; reniform powdery, often obscured shade. Secondaries fuscous, paler toward base. Beneath, suffu

Expands 32–37mm; 1.25–1.40 inches.

Habitat—Canada and United States.

Compared with *insignata*, this species differs in the less e muse vestiture of primaries; the color also less clear as The cell is not so distinctly black, and the ordinary spo dery. While it is difficult to locate the difference, yet the of this form is at once obvious.

Mr. Grote's variety *atropurpurea* is based upon the merest in shade and is a pure synonym.

There is a considerable amount of variation in this spec ntily where it ends I can not yet say. It is not impossible Californian forms some may yet be considered worthy of a sp Several specimens were in a lot received from Mr. Edwar the Sierra Nevada, California, and which I separated at firs term intrusa. More careful comparisons and studies lead m but that we have to do with a variety of tessellata, merel from the eastern form principally in a distinct reddish suffu primaries, and an infusion of yellow into the secondaries. tween the ordinary spots is not so distinctly black in some and in these the median shade is somewhat more apparen mm showing quite a strong resemblance to the mossaria f term intrusa may be used to denote this reddish powdere the ordinary spots pale and contrasting, the head and collar more reddish. The size and other characters resemble the t mens of this form labeled intrusa m. are in the collection

College, collection of Hy. Edwards, and collection of U. S. National Museum.

This form may be rather closely related to Mr. Grote's *strigilis*, which I do not know.

Carneades albipennis Grt.

1877. Grt., Buff. Bull., III, 118, *Agrotis*.
1878. Grt., Bull. Geol. Surv., VI, 175, *Agrotis*.
1883. Grt., Proc. Am. Phil. Soc., XXI, 156, *Agrotis*.
♀ *nigripennis* Grt.
1880. Grt., Bull. Geol. Surv., VI, 159, *Agrotis*.
1882. Grt., New List, 25 pr. syn.

Fuscous to deep blackish brown; the general appearance very like some forms of *insignata*, and this form can best be described comparatively. Smaller, somewhat narrower winged, the transverse lines much more faintly marked and finer; t. p. line usually obsolete; ordinary spots size and form as in *insignata*, but concolorous with darkest portion of wing (except cell). Secondaries ♂ white, ♀ fuscous. This latter character is distinctive of the species.

Expands 31^{mm}; 1.25 inches.

HABITAT.—East of Rocky Mountains, Canada.

This is a very pretty and distinct little species, which is easily recognizable by the smooth even coloring and dusky, large-sized ordinary spots. The white secondaries of the male as compared with the dusky color of the female easily separate the species from all the allied forms

Carneades spectanda Smith.

1890. Smith, Trans. Am. Ent. Soc., XVII, 54, *Agrotis*.

General color a rather bright luteous gray with a glaucus tint over all. Head somewhat darker, with a considerable admixture of black scales. Inferior part of collar also dusky, limited by a distinct transverse black line above which are white scales. The patagiæ are also somewhat darker and margined with black scales. Primaries very smooth in general color, the terminal space and costal portion of s. t. space darker, more powdery, cell filled with black about the pale ordinary spots. Basal line black, geminate, distinct. T. a. line geminate, well marked on costa, incurved on costal vein, thence slightly oblique outwardly to internal vein and a long outward curve below. T. p. line geminate, outcurved over reniform, then nearly parallel with outer margin; inner line narrow, crenulate, distinct; outer line even, much less evident. S. t. line narrow, pale, sinuate, marked by the darker terminal space. A series of black terminal lunules, and a yellow line at base of fringes. Claviform moderate in size, concolorous, distinctly outlined in black. Orbicular moderate in size, slightly irregular, but hardly oblique, distinctly black ringed and with a very narrow border of pale scales. Reniform moderate in size, of the normal form, with a

paler central line. Secondaries ♀ white, the veins dar
Beneath white, primaries somewhat smoky, and with a trace
line.

Expands 33mm; 1.32 inches.

HABITAT.—California (Neumoegen).

A single female only of this pretty and sharply defined s
hand. It has all the appearance and structural peculiaritie
sellata group. The white secondaries of the ♀ ally it with
while the maculation of primaries is much more like *albipen*
insignata. Some clearly marked specimens of *tessellata* re
species, but the white secondaries are always distinctive
specimen been a male the white secondaries would not h
important, as the female may have dusky secondaries when
♂ are white. The reverse, however, is never the case within
ence.

Carneades pallipennis Smith.

1887. Smith., Proc. U. S. Nat. Mus., x, 461, *Agrotis*.

Pale whitish gray, powdered with fuscous; terminal sp
Transverse lines geminate; t. a. slightly oblique and modera
between veins; t. p. crenulate, outwardly angulate on cost
then obliquely in a rigid line to internal margin. S. t. line
narrow, pale, marked by a preceding dark shade. A very f
shade. Claviform obsoletely indicated. Ordinary spots mo
mal in shape, incompletely outlined; cell between, dusky.
pure white. Beneath white; powdery toward apices: an
imperfectly marked common line. Head and thorax concol

Expands 31–33mm; 1.25–1.30 inches.

HABITAT.—Colorado, northwest British Columbia.

There is no difficulty in recognizing this species once it is
this group, but it might with almost equal justice have been
messoria and associated with *orbicularis*. The black shadi
indefinite; the median shade more or less evident on eac
It might even have been referred to the *pityochrous* group wi
violence to the arrangement. In truth this is one of those
forms that fit nowhere and has no decided characteristics.
those species that there is a temptation to utterly destro
of it.

A ♀ specimen from British Columbia, received since the
written, has the median shade less marked, the darkening of
tween the spots distinct, and a black spot before the orbi
reference to this group is therefore fully justified.

Carneades basalis Grt.

1879. Grt., N. Amer. Ent., I, 38, *Agrotis*.

[illegible] rather rusty red brown, basal space yellowish gra
[illegible] space darker brown. T. a. line indicated on costa and be

geminate, upright, limiting the pale basal space. T. p. line punctiform, subobsolete. S. t. line distinct, pale, irregular. Ordinary spots large, pale, well defined; orbicular open superiorly. Claviform faintly indicated, small. Secondaries pale, outwardly fuscous. Beneath pale, powdery toward apices and along costal margin; an indefinite common line and an obsoletely marked discal lunule. Head and thorax ferruginous.

Expands 37–40^{mm}; 1.5–1.6 inches.

HABITAT.—Colorado.

Very distinct by the red color and pale basal space. It shows by its wing form and habitus the relationship of the group to the *bostoniensis* section of the *messoria* group. The cell between the spots is only slightly darker.

Carneades solitaria Smith.

1885. Smith, Stett. Ent. Zeit., XLVI, 223, *Agrotis*.

Rusty, somewhat yellowish red; powdered with black scales; most distinctly in the median space. Transverse lines pale, gray, even, not well defined. S. t. line also gray but little sinuate. Terminal space powdered with black. Claviform obsolete. Ordinary spots distinct, moderate, yellowish. Orbicular round, reniform normal. Cell between the spots but little darker. Secondaries blackish. Beneath deep smoky gray, powdery; discal lunules evident. Head pale, thorax carneous gray.

Expands 33^{mm}; 1.32 inches.

HABITAT.—Labrador.

A single specimen from Mr. Moeschler, ticketed "? var. *conflua*." Typical *conflua* does not occur in America so far as I have been able to discover. The present species is certainly not *conflua* and agrees with no other form known to me. It has the wing form and somewhat similar color of *basalis*, from which it differs in smaller size, neatly defined, ordinary spots and lack of basal pale space, as well as by the blackish secondaries.

Carneades nostra Smith.

1890. Smith, Trans. Am. Ent. Soc., XVII, 55, *Agrotis*.

General color a somewhat luteous brown, varying a little in shade. Sides of palpi darker, the front sometimes with dark scales. Collar with a somewhat faintly marked median transverse line. Thoracic tuftings gray tipped, sometimes the entire thorax somewhat darker in shade than the ground color. Costal region powdered with gray, more broadly at base, terminal space blackish, not greatly contrasting, and somewhat variable in the amount of the dark shading; on apical blotch gray powdered. Basal line present, geminate, not well marked. T. a. line geminate, very slightly oblique, with a distinct outward curvature in the interspaces; the line is sometimes barely traceable, and the two parts are generally equally distinct. T. p. line nearly parallel with the outer margin, the inner line finely crenulated, outer line reduced

to a row of small venular dots which are sometimes wanting; sometimes the entire line is scarcely traceable. S. t. line irregular, concolorous, marked only by the dusky terminal space and by a vague preceding shade; a series of small terminal lunules. Claviform indefinitely outlined, concolorous. Orbicular oval, of good size, black ringed, gray powdered. Reniform large, kidney shaped, narrowly black ringed, concolorous or slightly paler, somewhat leaden filled inferiorly. The spots are always distinct, but somewhat variable in point of definition, sometimes incompletely outlined. The space between the spots is darker, but never black or prominent. One specimen shows a black spot preceding the orbicular, and another has the entire maculation obscured, the ground color paler than normal. Secondaries smoky fuscous, the veins darker, discal lunule of underside visible. Beneath powdery fuscous, with a discal spot on all wings and a variably distinct outer line. In one specimen the line is wanting entirely.

Expands 38–40^{mm}; 1.50–1.60 inches.

HABITAT.—Sierra Nevada, California.

This species is allied to *basalis* and *solitaria*, having all the structural characters of the *tessellata* group. In superficial appearance it strongly resembles *saucia*, and I am very sure I have seen the species mixed with *saucia* in collections. The tuberculate front and the structure of the antennæ will serve to distinguish the present species at once. It has the wing form of *saucia* rather than *tessellata*, and by this character and the dusky terminal space bears some resemblance to the *cinereomaculata* form of *ochrogaster* Gn.

The species seems tolerably common judging from the number of specimens sent.

Types in the Rutgers College collection, collection of Hy. Edwards, and collection U. S. National Museum. Mr. Neumoegen also has specimens in his collection.

Carneades ochrogaster Gn.

1852. Gn., Sp. Gen., Noct., I, 327, *Noctua*.
1856. Wlk., C. B. Mus., Lep., Het. X, 408, *Ochropleura*.
1880. Grt., Bull. Geol. Surv., VI, 566, *Agrotis*.
cinereomaculata Morr.
1874. Morr., Proc. Bost. Soc. N. H., XVII, 164, *Agrotis*.
1875. Grt., Can. Ent., VII, 226, *Agrotis*.
1875. Grt., Proc. Ac. Nat. Sci. Phil. 1875, 423, *Agrotis*.
gularis Grt.
1875. Grt., Proc. Ac. Nat. Sci., Phil. 1875, 424, *Agrotis*.
♀ *turris* Grt.
1875. Grt., Can. Ent., VII, 226, *Agrotis*.
1880. Grt., Bull. Geol. Surv., VI, 582, = *gularis*.

From bright clay yellow suffused with reddish to distinct red brown. In pale specimens median space more brown or reddish; terminal space darker fuscous; costa somewhat paler. A distinct basal black shade reaching to t. a. line and continued beyond that line as the black clav-

iform. Cell black, defining the ordinary spots; orbicular variable in size and shape, usually round, concolorous, powdered with gray, or entirely pale; rarely incomplete; reniform always distinct, complete, large, outlined by a black line annulate with yellowish, centrally clouded with dusky. Transverse lines often obsolete; when present, t. a. upright, sinuate, not crossing pale costal space; geminate; t. p. illy marked, somewhat extended on the veins, parallel with outer margin. S. t. line pale, marked on costa and below vein 6 by a preceding dusky shade. Secondaries dull fuscous. Beneath variable, powdery, with distinct discal spots. Head and thorax concolorous, collar with a dark line; thorax with low anterior and posterior divided tufts.

Expands 37–40^{mm}; 1.5–1.6 inches.

HABITAT.—Canada, Northern and Eastern States, Michigan, Missouri, Colorado.

A very distinctly marked and easily recognized species. The synonomy was caused in part by some confusion of identification between Mr. Grote and Mr. Morrison. Mr. Morrison's type is a very pale form in which the ordinary spots are gray. He did not recognize the type form of *turris* as being the same species, and hence, apparently, Mr. Grote's error. (See Can. Ent., 7, 226.)

I have no doubt of the correctness of this identification of Guenée's species.

Carneades idahoensis Grt.

1878. Grt., Bull. Geol. Surv., IV, 171, *Agrotis*.

Fuscous red brown, the costa broadly gray, as are also the ordinary spots. A distinct basal dash black; cell black; claviform narrowly outlined in black. Transverse lines obsolete, very faintly traceable. S. t. line pale, irregularly dentate, often barely visible. Orbicular oblique, oblong, open superiorly; reniform moderate, kidney-shaped. Secondaries pale fuscous. Beneath powdery, pale; an exterior common line and discal lunule, darker. Head and thorax concolorous; collar with a black line.

Expands 32–36^{mm}; 1.30–1.45 inches.

HABITAT.—Idaho, Colorado, Nevada.

A very easily recognizable species; very distinct from anything else in the group, except, perhaps, *westermani* and *furtivus*, from each of which it has been already sufficiently distinguished. It bears a more than casual resemblance to some of the forms referred to the *quadridentata* group of the genus.

Carneades furtivus Smith.

1890. Smith, Trans. Am. Ent. Soc., XVII, 56, *Agrotis*.

Ground color varying from fuscous gray to bright red brown. Head and thorax evenly concolorous, collar with a central black, transverse line. Primaries with costal space to t. p. line pale, discolorous, in the

brown specimens most prominently so. Basal line want events not traceable. T. a. line usually obsolete, in one w brown specimen traceable as a pale, outwardly oblique li definite margins, and angulate in the interspaces. T. p. lin rather even, pale, outcurved over the cell and slightly in riorly; inner part of line usually distinct, outer part not w in some specimens the line is not traceable below the costa. darker costally, a distinct dark shade and a series of sagitt spots preceding the narrow, pale, and slightly irregular s. minal space darker than ground color. In a brown specime marked t. p. line the s. t. is decidedly paler than the median this is the case to a variable extent where the t. p. line is n black basal dash, interrupted by the t. a. line, the small loc iform continuing the dash beyond the line; this spot is ve distinct, but usually not completely outlined. Cell around t spots dusky to black. Orbicular variable in shape, always riorly. V-shaped to oblong, oblique, the change being made the outer horn of the V; in color like the costal region, som a darker center. Reniform moderate in size, kidney-sha ringed, the center concolorous with costa or somewhat da ondaries smoky fuscous, with a variably evident discal lunul powdery with a very variable distinct outer line and a mor defined discal spot to all wings.

Expands 35–38^{mm}; 1.38–1.50 inches.

HABITAT.—California (Neumoegen).

Three very strongly dissimilar specimens, all females. is most nearly allied to *idahoensis*, differing principally in t tinct shade containing still darker sagittate spots preced line, which is less dentate than in its ally. The variation indicated in the description.

Carneades westermani Stgr.

1857. Stgr., Stett. Ent. Zeit., 1857, 383, *Agrotis*.

Smoky fuscous brown; the costa broadly gray. All the lete. A basal black line; cell blackish; claviform marked spots concolorous, gray powdered. Orbicular round, open iform not distinctly outlined. Secondaries fuscous; a da evident. Beneath dusky, powdery; a distinct dark dis Head and thorax concolorous; collar inferiorly gray, mar black line.

Expands 32^{mm}; 1.30 inches.

HABITAT.—Labrador, Greenland.

Allied to *idahoensis*, but at once distinct, not only by t differences in maculation, but also by the shape of primari this species have the costa very strongly convex, whereas in

the costa is straight. The specimen under examination I believe came from Moeschler by the courtesy of Mr. Cramer. I have never seen another anything like it.

Carneades obeliscoides Gn.

1852. Gn., Sp. Gen. Noct., II, 293, *Agrotis.*
1856. Wlk., C. B. Mus. Lep. Het., X, 331, *Agrotis.*
1878. Graef., Bull. Bkln. Ent. Soc., I, 9=*obelisca.*
obelisca ♀ Wlk.
1856. Wlk., C. B. Mus. Lep. Het., X, 323, *Agrotis.*
sexatilis Grt.
1873. Grt., Buff. Bull., I, 100, *Agrotis.*
1875. Grt., Buff. Bull., II, 203, pr. syn.
1875. Grt., Can. Ent., VII, 102, pr. syn.
1878. Graef., Bull. Bkln. Ent. Soc., I, 9=*obelisca.*

Red brown, or darker; median space deeper brown; cell black; costa to t. p. line white or pale gray. Transverse lines distinct, geminate; t. a. not crossing costa, oblique, curved between veins; t. p. oblique, sinuate, slightly crenulate. S. t. line pale, interrupted very irregular; terminal space somewhat darker; a slightly darker costal patch preceding s. t. line. A black basal dash. Claviform rather large, distinctly outlined, surmounted by a broad paler streak. Stigmata distinct, usually round and generally complete; outlined in black; a distinct white annulus, the center concolorous. Reniform large, complete, pale or white, a concolorous lunule toward inner margin. Secondaries fuscous; often paler toward base. Beneath variable, powdery with discal, and s. t. common transverse shade lines, discal lunules usually evident. Head and thorax concolorous; collar with a somewhat indistinct transverse line.

Expands 31–37^{mm}; 1.20–1.50 inches.

HABITAT.—East of Rocky Mountains.

Easily distinguished from all others of the group by the large triggonate primaries, the white costa, strongly arched in most specimens, and large discolorous reniform.

Carneades infelix Smith.

1890. Smith, Trans. Am. Ent. Soc., XVII, 57, *Agrotis.*

General color red-brown, varying in shade. Head and collar inferiorly either gray or yellow, with a ferruginous admixture, contrasting; a black transverse line across the middle of the collar limits the pale space superiorly, and above this line the collar is concolorous with thorax. Thoracic disk in the specimen even, concolorous; in another the entire color is darker, the tuftings are gray tipped, the patagiæ with gray powderings and margined with black. Primaries with costal region discolored yellow, with a ferruginous or an ash-gray powdering, gradually merging into the ground color before the inception of the t. p. line. Basal line whitish, loop-like, cutting a disk out of the

...ible only in the s. t. interspace, where ... in the form of an outcurved pale line ... narrow, single, finely crenulated, ... very evenly parallel with the ... ♀ no trace of the line is visible. ... through the median and s. t. space ... a gray apical spot and is punctiform ... preceded by sagittate black dashes; ... terminal space is slightly more dusky, and ... black terminal dots; in the ♀ a grayish suffu- ... relieves and lightens the s. t. space, ... sagittate dashes and makes the terminal space ... ornamentation, otherwise, is as in the ♂, save that ... and some of the spots are connected, showing ... dentate on veins 3 and 4. Claviform distinctly ... variable in size and form, center concolorous, sur- ... variable pale yellowish streak crossing the ... Orbicular oval, oblique, complete, black ringed, then ... center of the color of costal region; reniform large, ... yellowish, interiorly dark grayish marked. ... marginal macula is gray marked. Secondaries ... with a row of terminal darker lunules, fringes paler.

... (Lederer, Noctuidæ, etc.).

... known species comes nearest to *obeliscoides* ... perhaps as nearly allied to *pereaceilens* ... from the former it is distinct by the lack of ... from the latter by its very ... inherent s. t. line, and ... the same direction ... showing strong differ- ...

... U. S. National ... claviform black,

... and ... ...

powdery, an external common line and discal spot. Thorax and head concolorous; collar with a dark line.

Expands 39mm; 1.55 inches.

HABITAT.—Iceland, Labrador.

Closely allied to *obeliscoides*, the typical maculation entirely present. It differs from that species in the comparatively longer, narrower primaries, the non-contrasting ordinary spots, and in the position of the t. p. line, which in *obeliscoides* is very close to the reniform, but in *islandica* is far beyond it, half way to the outer margin. This widens the median and narrows s. t. space in this species.

The description is introduced here only because the species has so long been catalogued in our lists and has been entirely mistaken. I do not think it has ever been found in North America, but very likely will be found in Alaska or in the Hudson Bay territory. The locality (Labrador) given by Staudiger is based upon *opipara* Morr., which is not this species at all.

Carneades colata Grt.

1881. Grt., Can. Ent., XIII, 131, *Agrotis*.

"♀ Like *versipellis*, but a little larger and without the white lines on the veins. Entirely dark, purply brown; thorax and head reddish brown. Stigmata a little hoary; orbicular large, open; reniform wide; claviform indicated. Lines very faint; an indistinct, paler shade following the t. p. line; the terminal space also indistinctly paler. Hind wings concolorous dark fuscous. Mount Hood, one fresh female specimen. Can not be confounded with any other species from the color and its affinity with *versipellis*."

No specimen to which this description could be fitted has been found as yet. The characters given would seem to indicate a species close to *tessellata*, but the open orbicular forbids the suggestion that it may be a form of that protean species.

Two female specimens in Mr. Neumoegen's collection, seen since the above was written, may perhaps be referable here. They were taken in the Sierra Nevadas, and agree fairly well with the above description, save that in one case the orbicular is complete and in the other it is simply not completely outlined above. I have named these specimens *colata* provisionally, until an opportunity for the study of the type occurs. The species is correctly placed near *versipellis*, which it resembles in the manner suggested by Mr. Grote.

Carneades divergens Wlk.

1856. Wlk., C. B. Mus., Lep. Het., X, 327, *Agrotis*.
versipellis Grt.
1875. Grt., Can. Ent., VII, 172, pl. i, f. 9, *Agrotis*.
1879. Grt., Bull. Geol. Surv., V, 206, *Agrotis*.
1889. Butler, Trans. Ent. Soc. Lond, 1889, 380 pr. syn.

Red to dark blackish brown; terminal space usually a little darker; cell black; subcostal and median vein distinctly white to end of cell;

a black, sometimes diffuse, basal patch. Transverse lines essentially as in *obeliscoides*, but the median space is somewhat more narrowed inferiorly. S. t. line distinct, pale, sinuate, and slightly dentate. Ordinary spots moderate, defined, annulate, and powdered with white. Orbicular ovate, oblique; reniform upright, rather narrow, kidney-shaped. Claviform evident, distinctly outlined, variable in size. Secondaries fuscous. Beneath powdery, variable in color; a more or less distinct common line and discal spot. Head and thorax concolorous; the collar with a distinct black line.

Expands 32–34^{mm}; 1.25–1.35 inches.

HABITAT.—Northern States to Colorado, California.

This species has the appearance and maculation of *obeliscoides*, without the pale costa and ordinary spots of that species; but with white subcostal and median veins which render this species very evidently distinct. Though widely distributed, the species is not common, and I have thus far met with no record of its capture in the Southern States. From California I have specimens not differing to any extent from our eastern forms, and in the Sierras it seems more common than in the east. In substituting *divergens* for *versipellis* as the name of this species, I follow Butler in his identification of Walker's type. Walker records his specimen from Nova Scotia.

Carneades redimicula Morr.

1874. Morr., Proc. Bost. Soc. N.H., XVII, 165, *Agrotis* (*redimacula*).
1875. Morr., Proc. Ac. Nat. Sci. Phil., 1875, 75. *Agrotis*.
1879. Strk., Rept. Chief Eng., 1878–'79, v, 1861, *Agrotis*.

Reddish to dark fuscous brown, washed with bluish gray; median and terminal space darkest. Costal portion of basal space paler gray; basal black dash diffuse. T. a. line obsoletely marked below median vein; outwardly oblique geminate. T. p. line indistinctly marked, evenly sinuate. S. t. line pale subobsolete, sinuate, most generally marked only by the difference in shade between s. t. and terminal spaces. Claviform marked. Ordinary spots very large, even bluish gray; well defined. Secondaries fuscous, paler toward base. Beneath variable in shade, powdery, a distinct discal lunule on each wing. Head and thorax concolorous; collar inferiorly gray, followed by a distinct limiting black line.

Expands 30–33^{mm}; 1.20–1.30 inches.

HABITAT.—Northern States east of Rocky Mountains; Canada.

A rather small form with short, broad primaries, and very large evenly gray ordinary spots. The gray so largely predominates that it gives the impression of a much more even coloring than actually exists. The difference of color in basal space is a distinctive feature. The insect is not rare and yet is not very abundantly represented in collections. Mr. Strecker records it from Colorado in September, Mr. Hill says July 30 in the Adirondacks.

Carneades atrifera Grt.

1878. Grt., Bull. Geol. Surv., IV, 173, *Agrotis*.
1880. Grt., Bull. Geol. Surv., VI, 260, *Agrotis*.

Grayish fuscous, the narrow terminal space somewhat darker. A black shade at base; cell black. T. a. line geminate oblique, curved between veins. T. p. line obsolete or very faint. S. t. line unusually close to margin, faint. Veins somewhat marked with darker fuscous. Claviform faintly outlined, rather large. Ordinary spots moderate, concolorous, or slightly paler; orbicular oval not quite closed superiorly. Secondaries pearly gray, outwardly darker. Beneath pale, powdery; a distinct discal lunule. Head and thorax concolorous; collar with a distinct black line.

Expands 31–34^{mm}; 1.25–1.35 inches.

HABITAT.—Sierra Nevada, California; Maine.

A very distinct form, readily recognized by even fuscous color, rather obsolete transverse lines and distinct ordinary spots. It conflicts with none other in this group. The geographical distribution is worthy of note, and indicates that the species will be found in British Columbia.

Carneades tesselloides Grt.

1880. Grt., Bull. Geol. Surv., VI, 566, *Agrotis*.

Fuscous, washed with various shades of gray; terminal space usually darker; costal region paler gray. Transverse lines geminate, not distinctly marked course much as usual. S. t. line distinct pale, sinuate. Basal dark dash diffuse, somewhat indistinct; cell variably darker. Claviform outlined, not distinct. Ordinary spots large, gray; orbicular ovate, often not quite complete superiorly. Secondaries whitish to fuscous. Beneath, pale powdery. Head and throax concolorous; collar with a black line.

Expands 31–38^{mm}; 1.25–1.50 inches.

HABITAT.—California, Arizona, Montana.

A near ally of *silens*, but much darker and more definitely marked, yet the maculation aside from its depth or definition is identical, and I regard the distinctness of the species as not free from doubt, the more so as this species is exceedingly variable in size, ground color, and distinctness of maculation.

Carneades silens Grt.

1875. Grt., Can. Ent., VII, 67, *Agrotis*.

Whitish over pale fuscous; costal region and ordinary spots gray. Transverse lines geminate barely traceable. S. t. line obsolete. Terminal space slightly darker; veins faintly dark lined. A distinct black basal streak; cell blackish. Claviform faintly marked. Ordinary spots moderate, defined; orbicular oval, not quite closed above. Secondaries white. Beneath white, powdery. Collar with a black line; head and thorax concolorous.

Expands 38mm; 1.5 inches.

HABITAT.—California, Nevada, Arizona.

Easily recognizable by the pale color and lack of transverse maculation. It conflicts with no other species of the group except perhaps *tesselloides*, and it may eventually claim that species as a variety. There is, however, an ashen gray tinge to *tesselloides* which is replaced in this species by a yellowish tint. The difference is not a very great one, but suffices to change very completely the habitus of the species.

Carneades strigilis Grt.

1876. Grt., Buff. Bull., III, 81, *Agrotis*.

"♀. All the tibia spinose, belonging to the *tessellata* group. Forewings, thorax, and head blackish fuscous, somewhat olivaceous; at base of head and collar some ochrey scales. The transverse lines are obsoletely geminate; the white or gray included shades are prominent and relieve the accompanying dark transverse lines. Lines dentate, nearly perpendicular. Stigmata moderately large, shaded with whitish; claviform concolorous, barely indicated. Terminal space a little paler. S. t. line fine, powdery gray; fringes concolorous. Hind wings pale fuscous, with paler interlined fringes. Beneath translucent centrally with powdered costal region, faint discal mark and line."

Expands 32mm; 1.28 inches.

HABITAT.—Vancouver Island (Mr. Hy. Edwards).

I have not been able to identify this satisfactorily. There are two or three doubtful forms in this group to which I have hesitated in applying names, and to one or the other of them—all from California—this name may prove applicable.

SPECIES UNKNOWN TO ME.

Agrotis dapsilis Grote.

1880. Grote, Bull. Geol. Surv., VI, 582, *Agrotis*.

Front smooth, vestiture hairy, antennæ of ♂ bipectinate. Pale ash-gray, powdered with blackish. Transverse lines consisting of a series of blackish, venular spots. S. t. line faintly marked by a slight difference in tint between s. t. and terminal space. A dusky terminal line. Orbicular a small blackish spot. Reniform narrow, dusky, upright. Secondaries outwardly dusky.

Expands 31mm; 1.25 inches.

HABITAT.—Florida.

To the kindness of Mr. Thaxter, I owe an opportunity of examining the type. It is in miserably poor condition, and it is impossibly to say certainly where it belongs in the series. The middle legs alone remain; a stump about 1mm long of the left antennæ is all that remains of those organs; and last and most provoking there is a ♀ body pasted on what

was obviously a ♂. The species is thoroughly aberrant for an *Agrotis*, but there is not enough of it remaining to dispute the generic reference.

It seems to suggest my *tepperi* to some extent and may find a place near it when good fortune turns up other specimens.

Agrotis littoralis Pack.

1868. Pack., Proc. Bost. Soc. Nat. Hist., XI, 36, *Agrotis*.

♂ of a uniform glossy, pale, luteous, tawny brown; antennæ well pectinated; palpi very large and stout, with long cilia beneath; third joint long, porrect, cylindrical, acute. Front concolorous with thorax and abdomen being of a pale brown. Fore wings smooth, on the basal third of the wing a black, irregularly, quadridentate line, the teeth between the nervures pointing outwards between the median, s. m., and internal nervures, but directed inwards on the median space, then curving outwards on the costa nearly to the middle of the inner discal circle, which is large and formed by a simple, brown, unshaded ring. The outer reniform spot is large and shaded on the inner half, especially on the lower end at the origin of the mesial nervures. Beyond is a simple line, broadly curved opposite the reniform, from the outer third of the costa to the inner third of the hind margin. Beyond is a parallel line of dark streaks of uniform length, and beyond is a submarginal line, diffusely shaded inwards and forming a diffuse, triangular, dusky spot on the costa, below which is an angular sinus; on the submedian fold it is bent inwards. A marginal dark line, scarcely interrupted at the nervures. Fringe long, concolorous with the rest of the wing. Hind wings a little more dusky than the anterior pair; pale on the costa, edge dark, fringe pale, tawny, concolorous with the costa. Thorax darker than the body. Beneath dusky, with a diffuse, dusky, discal spot and two parallel dusky lines. Beyond, a broad paler margin. On the hind wings is a lunate discal spot, and an outer, diffuse, duskier-shaded spot on the costa. Length of body .62, fore wing .60 inch.

Differs in its fore wings, being of a uniform tawny color, with a plain ringlet and large reniform dot, with the rows of dots beyond; and by the well pectinate antennæ. Labrador, Caribou Island.

Apparently near *manifesta*, but very different from anything known to me. I did not find this in the Peabody Museum, and never saw anything like it elsewhere.

Agrotis hero Morr.

1876. Morr., Proc. Bost. Soc. N. H., XVIII, 238, *Agrotis*.
1880. Grt., Bull. Geol. Surv., VI, 160, *Agrotis*.

"Related to *collaris* and *badinodis* Grt., separated from them by the unarmed fore tibia. Collar black and discolorous above. Thorax concolorous with the anterior wings. Anterior wings crossed by two fine simple dark brown lines, the first preceded, the second followed by a pale accompanying shade. Ordinary spots not very well defined,

shaped as in *collaris*, the orbicular preceded by a black spot. Median shade distinct passing between the spots; s. t. space darker brown; s. t. line indefinite. Posterior wings uniform dark brownish gray, discal dots present. Beneath brownish gray, with discal spot and a common diffuse median line."

Expands 32mm.

HABITAT.—Massachusetts.

Entirely unknown to me.

Agrotis drewseni Stgr.

1857. Stgr., Stett. Ent. Zeit., 1857, 302, *Agrotis*.

"Cinerea, albido-conspersa, alarum anticarum lineis transversis, punctis anticis fasciaque externa nigricantibus. Magn. 29–30mm, ♂ ♀.

Habitus of *islandica*, primaries still longer and narrower. ♂ antenna serrate and shortly bristled. Ground color dirty ash gray. Collar with a black line. Primaries most like bright specimens of *A. cursaria*, but ash instead of yellowish gray. At base and costal space strongly sprinkled with white atoms. At the costal margin in addition are a few obsolete dark spots. Median lines sharply defined, black; t. a. inwardly margined with white; t. p. line S-shaped, in the middle with four acute points. Ordinary spots somewhat paler than ground color; claviform wanting. In one ♂ specimen there is between the spots a bent black transverse line, strongest at hind margin, almost attaining anterior margin. At outer third is a paler, indefinite transverse shade which, as in *islandica*, has no sagittate marks, or has them but faintly indicated. Between this and the outer margin is a darker shade which does not attain the anterior margin. In the paler basal space a rudimentary transverse line is visible, strongly margined outwardly with white. Fringes ash gray, mixed, with a darker line at base. Beneath, dirty whitish gray, at the anterior margin with darker atoms. Cell rather darker. Secondaries uniformly gray; fringes white, at the base yellowish. Beneath dirty white at outer margin darker, at anterior margin with darker atoms. An indefinite discal spot.

HABITAT.—Greenland.

This species is apparently close to *munis* Grt. (=*sublatis* Grt.), and indeed it is somewhat difficult to mark exactly what the differences between the two can be. Still I have hesitated to make them synonyms without seeing specimens more nearly agreeing with the too detailed description.

Agrotis nanalis Grt.

1881. Grt., Can. Ent., XIII, 131, *Agrotis*.

"♀. The smallest species known to me.. All the tibiæ spinose; eyes naked; body untufted. A slender species which may be compared to *opaca*. The fore wings are blackish with the lines lost. The stigmata are concolorous, difficult to make out. The orbicular is elongate, the

reniform vague; upright, broad; the spots are picked out by a brown shading which fills the cell and marks the subcostal and median veins. S. t. line a vague blackish even shade. Hind wings concolorous fuscous griseous, with the veins soiled and a faint discal mark. Beneath griseous, the primaries a little brownish. The costal preapical dots visible beneath and to be made out on the upper surface. Abdomen like hind wings. Head brownish; tegulæ blackish; disc of thorax paler. Expanse 26mm; Nevada."

Nothing to which this description will fit is known to me.

Agrotis viralis Grt.

1880. Grt., Bull. Geol. Surv., VI, 260, *Agrotis*.

"♂. Antennæ ciliate beneath. Fore tibiæ unarmed, unless accidentally the spines are broken off, which sometimes occurs. Pale faded yellow fuscous, collar with a faint line. The lines obsolete. A blackish dash at base; another below it on internal margin; a dash across the submedian space, and the cell before and between the stigmata darker shaded. Stigmata pale, concolorous moderate. Orbicular outwardly oblique near the reniform at base; both stigmata incompletely dark ringed. S. t. line indicated; s. t. space paler; terminal space darker. Hind wings paler, nearly concolorous with fore wings; darker shaded along outer border. Body concolorous; beneath without markings; hind wings quite pale. Expanse 38mm. Habitat—Nebraska."

No species to which this description could apply is known to me.

Agrotis juncta Grt.

1878. Grt., Bull. Geol. Surv., IV, 171, *Agrotis*.

"♂. Size of *Treatii*, which this species resembles in its dead black primaries. Collar black at base, pale tipped. Head pale; thorax brown; abdomen pale fuscous. Fore wings with the t. a. line rounded, black; attached to it is the black pale-margined claviform. Ordinary spots concolorous, large, finely outlined with pale and fused below; the claviform apparently touching the orbicular at base. S. t. line followed by small, pale marks. Hind wings pale fuscous. Beneath pale, with indistinct common line, and discal marks obsolete. Nova Scotia (*Mr. Roland Thaxter*). One specimen."

Would seem to be a very distinctly marked form allied to *hollemani*, but possibly not belonging to that group. Mr. Grote gives us no structural characters whatever to serve as an index to its position. On the list he places it before *haruspica* and close to *innotabilis*, two structurally different species.

Agrotis fishii Grt.

1878. Grt., Bull. Geol. Surv., IV, 175, *Agrotis*.

"♂. ♀.—In color and appearance resembling *janualis*, but the tibiæ are all spinose. Obscure purple gray. The orbicular obsolete. Lines

fine, black, single, dentate. Half line visible. T. a. line erect, with two small subequal projections on cell and below costa. Median shade outwardly oblique, running to lower extremity of reniform; this latter is moderate, and filled in with greenish-white scales. T. p. line dentate, forming points on the veins. Subterminal line with a blackish, preceding shade at its inception on costa, interrupted, forming two marks opposite the cell very slightly margined outwardly with greenish white. A terminal black line almost continuous. Hind wings fuscous with reddish fringes. Thorax concolorous purple gray; no line on collar. Beneath body and legs obscure purplish, abdomen reddish. Wings reddish, fuscous with common dark shade line, and discal marks equally distinct. Oldtown, Maine (Mr. Charles Fish). The primaries are more pointed at apices than in *janualis*. The dark shade before s. t. line and obsolete orbicular are strong characters. The male antennæ are pyramidal-toothed, ciliate; hind wings pale fuscous."

"Expansion 33mm."

Mr. Grote has associated the species with *baja* in the check-list; but the structure of antennæ will hardly suffer it to remain there. Yet we are unable at present to assign a certain position to it. It seems in some respect, *i. e.*, the single lines, allied to the *carnea* group; but very different from any species known to me.

Somewhere I have seen a specimen named *fishii* by Mr. Grote, and this was very like *catherina* Grt. I do not find that I made any note of it, however.

Agrotis tenuicula Morr.

1874. Morr., Proc. Bost. Soc. N. H., XVII, 163.

"Habitus and markings of *Agr. conflua* Tr., from which it differs in the uniform gray color of the posterior wings, the presence of two distinct cuneiform markings before the subterminal line and below the costa, and in the size of the subterminal space which is much wider than in *conflua*."

Expanse 33mm.

HABITAT.—New York.

The chances are that this is a form of *perconflua* Grt., but I am not prepared to make the reference definitely. I have no idea who could have furnished the type of the species and have never seen any specimens so named.

Mamestra insula Wlk.

1856. Wlk., C. B. Mus., Lep. Het., IX, 234, *Mamestra*.
1873. Grt., Bull. Buff. Soc. N. Sci., II, 15, *Hadena*.
1883. Grt., Ill. Essay, 43, *Agrotis*.

"Foem.—Obscure ferrugineo-fusco; abdomen fusco-cinereum; alæ anticæ lituris basalibus et costalibus nigris; lineis transversis undulatis duplicatis nigris ex parte testaceo marginatis, linea exteriore transversa undulata incompleta testacea, maculis reniformi et orbiculari magnis ex parte testaceis; posticæ cinereæ marginibus fuscis.

"*Female.*—Dark ferruginous brown. Abdomen brownish cinereous. Fore wings with black marks at the base and along the costa, and with transverse undulating black double lines, which are partly bordered with testaceous; an exterior incomplete transverse undulating testaceous line; reniform spot and orbicular spot large, partly testaceous, the latter somewhat oval. Hind wings cinereous, with brown borders and pale cinereous ciliæ. Length of the body 7 lines; of the wings 16 lines.

"*a.* Orilla, West Canada. From Mr. Bush's collection."

It is impossible to apply this description. Mr. Grote, whose reference of the species to *Agrotis* has been followed, gives no suggestion as to the species it most resembles or where its allies are to be found.

Agrotis patula Wlk.

1856. Wlk., C. B. Mus., Lep. Het., x, 329.

"Mas.—Cervina; antennæ mediocriter pectinatæ; thorax pilis nonnullis albidis; abdomen basi pallidum; alæ anticæ latiusculæ, lituris nigricantibus; claviformi elongata, orbiculari subpyriforme, lineis duabus exterioribus transversis angulosis, lunulisque marginalibus; posticæ pallide cinereo-cervinæ.

"*Male.*—Fawn color. Antennæ moderately pectinated. Thorax with some whitish hairs. Abdomen paler toward the base. Fore wings rather broad, with the usual marks blackish; claviform spot elongate; orbicular subpyriforme; reniform as usual; two exterior transverse zigzag lines and a row of marginal lunules. Hind wings pale cinereous fawn color. Length of the body 7 lines; of the wings 16 lines.

"*a.* Rocky Mountains. Presented by the late Earl of Derby."

Nothing answering sufficiently well to this description is known to me. The pectinated antennæ, however, narrow the possibility of association somewhat.

Agrotis hæsitans Wlk.

1856. Wlk., C. B. Mus., Lep. Het., x, 329.

"Mas.—Obscure cervina; palpi fusci; antennæ nigræ, mediocriter pectinatæ; abdomen pallidum; alæ anticæ lituris basalibus, striga discali, strigis exterioribus, fascia imcompleta, macula subquadrata, lunulisque marginalibus nigris, orbiculari et reniformi indistinctis; posticæ cinereæ, margine fuscescente ciliis albidis.

"*Male.*—Dull fawn color. Palpi brown. Antennæ black, moderately pectinated. Abdomen paler than the thorax. Fore wings with black marks at the base, with a slight black streak in the disk, with an incomplete black band, with exterior black streaks, and with black marginal lunules; a black, subquadrate spot between the orbicular and reniform spots which are indistinct. Hind wings cinereous, brownish toward the border; ciliæ whitish. Length of the body 6 lines; of the wings 14 lines.

"*a.* United States. Presented by E. Doubleday, Esq."

Agrotis radix Wlk.

1856. Wlk., C. B. Mus., Lep. Het., x, 332.

"Ferrugineo fusca; thorax nigro fasciatus; abdomen cinereum, lateribus ferrugineis; alæ anticæ lineis nonnullis transversis undulatis pallidioribus et obscurioribus, linea submarginali anguloso albida, striga basali lunulisque marginalibus nigris orbiculari et reniformi obscuriore marginatis, hac maxima, illa subovata; posticæ cinereæ, marginibus obscurioribus. Mas.—Antennæ ciliatæ; abdomen valvulis apicalibus magnis luteo pilosis.

"Noctua radix Barnston MSS.

"Ferruginous brown. Thorax with a black band. Abdomen cinereous ferruginous along each side. Fore wings with several undulating paler and darker lines, the submarginal line angulose and whitish; a black basal streak and black marginal lunules; orbicular and reniform spots with darker borders, the former irregularly oval, about half the size of the latter, which is very large. Hind wings cinereous with darker borders.

"*Male.*—Antennæ ciliated. Abdomen with large apical valves, whose hairs are somewhat luteous. Length of the body, 6 lines; of the wings, 16 lines.

"*a.* St. Martin's Falls, Albany River, Hudson's Bay. Presented by Dr. Barnston.

"*b.* Nova Scotia. From Lieutenant Redman's collection."

Agrotis perlentans Wlk.

1856. Wlk., C. B. Mus., Lep. Het., x, 332.

"Mas.—Fusca; antennæ simplicis aut vix ciliatæ; abdomen cinereum; alæ anticæ striga discali interrupta nigricante; orbiculari et reniformi indistinctis pallido marginatis; posticæ cinereæ, macula discali marginesque fuscescentibus.

"*Male.*—Brown. Antennæ simple or hardly ciliated. Abdomen cinereous. Fore wings with a blackish streak between the base and the orbicular spot, and between the latter and the reniform spot; spots indistinct, with pale borders. Hind wings cinereous with a brownish discal spot and brownish borders. Length of the body, 6 lines; of the wings, 14 lines.

"*a.* New York. Presented by E. Doubleday, Esq."

Agrotis mollis Wlk.

1856. Wlk., C. B. Mus., Lep. Het., x, 333.

Foem.—Cana; thorax ferrugineo fuscoque fasciatus; abdomen cinereum; alæ anticæ ferugineæ, lineis transversis canis nigresque, exteriore arcuata, submarginali undulata, striga brevi discali atra; orbiculari subovata, reniformi vix excavata.

"Noctua mollis, Barnston MSS.

"*Female.*—Hoary. Thorax with ferruginous and brown band. Abdomen and hind wings cinereous. Fore wings mostly ferruginous; the usual transverse lines hoary and blackish, and very distinct; the exterior one curved, the submarginal one undulating; a short discal deep black streak extending to the reniform spot and interrupted by the orbicular one; the latter is irregularly oval, and not much smaller than the reniform, which is hardly excavated. Length of the body, 7 lines; of the wings, 14 lines.

"*a.* St. Martin's Falls, Albany River, Hudson's Bay. Presented by Dr. Barnston."

Graphiphora illapsa Wlk.

1857. Wlk., C. B. Mus., Lep. Het., xi, 744.

"Foem.—Subferrugineo-cinerea; palpi nigro fusci, apice pallidi; thorax antice nigro fasciatus; abdomen cinereum; alæ anticæ nigro conspersæ, lituris costalibus lineisque valde incompletis nigris, orbiculari obsoleta, reniformi e lituris nigris, fasciis duabus latus ferrugineis lineaque intermedia albida exterioribus; posticæ cinereæ, ferrugineo marginatæ.

"*Female.*—Cinerous, with a slight ferruginous tinge. Palpi blackish brown, with pale tips. Thorax with a black band in front. Abdomen cinereous. Fore wings minutely speckled with black, with black costal marks, and with very incomplete black transverse lines; orbicular spot obsolete; reniform indicated by some black marks; a broad exterior ferruginous band, partly divided by a whitish line from the pale ferruginous marginal band. Hind wings cinereous, ferruginous towards the borders. Length of the body, 14 lines; of the wings, 26 lines.

"*a.* St. Martin's Falls, Albany River, Hudson's Bay. Presented by Dr. Barnston."

This is intimately associated with *augur* by Mr. Walker, the latter species being credited to the same locality. It may be something very like *Pachnobia*, or possibly a form nearly allied to *elimata* Gn.

Agrotis ordinata Wlk.

1865. Wlk., C. B. Mus., Lep. Het., xxxii, 691.

"Foem.—Cinerea, nigro conspersa, palpi porrecti, articulo 3° brevissimo; antennæ subsetulosæ; tibiæ basi fasciculatæ, alæ anticæ lineis quator nigris, 1a 2aque duplicatis, 1a abbreviata, 3a dentata, 4a denticulata, spatio marginati fuscescente lineam submarginalem angulosam includente, orbiculari et reniformi magnis nigro marginatis; posticæ pallide cinereæ, puncto discali venis spatioque marginali obscurioribus.

"*Female.*—Cinereous, black speckled. Palpi porrect, extending a little beyond the head, second joint clothed with rather long hairs; third joint conical, very minute. Antennæ very minutely setulose. Abdomen paler, extending a little beyond the hind wings. Femora fringed on the inner side; tibiæ and tarsi spinose, the former with a

cuff of long hairs at the base. Fore wings with four transverse black lines; the first and second lines double, first near the base, abbreviated inferiorly; second at half the distance between the first and the orbicular mark; third dentate, somewhat diffuse, between the orbicular mark and the reniform mark; fourth denticulate, beyond the reniform mark; submarginal line zigzag, of the ground tint, but distinguished by the brownish shade which it traverses. Marginal line black, lunulate; orbicular and reniform marks large, with black borders, which are interrupted in front, the former slightly elongated and oblique, the latter of the usual form. Hind wings pale cinereous, darker toward the exterior border. Basal joints and veins also darker; fringe white. Length of the body, 5 lines; of the wings, 18 lines.

"West Canada. In the Rev. Mr. Bethune's collection."

This description applies very fairly well to some pale forms of *messoria*, and the species must be close to the latter from the characters given.

Agrotis venusta Wlk.

1865. Wlk., C. B. Mus., Lep. Het., xxxii, 691.

"Mas.—Fuscescente cinerea; palpi obliquæ ascendentes, articulo 3° longi-conico; antennæ robustæ, setulosæ; alæ anticæ nigro conspersæ, striga basali litarisque paucis nigris, orbiculari annuliformi, linea submarginali cinerea angulosa, punctis marginalibus nigris; posticæ pallide cinereæ, fuscescente marginatæ.

"Male.—Brownish cinereous. Palpi obliquely ascending, not rising so high as the vertex; second joint clothed with short closely applied hairs; third joint elongate-conical, acute, very minute. Antennæ stout, very minutely setulose. Abdomen cinereous, extending somewhat beyond the hind wings; apical tuft very large. Fore wings thinly black speckled, with a blackish basal streak, and with a few indeterminate black marks behind the orbicular mark and near the exterior border; orbicular mark composing a rather large black ringlet; reniform mark of the usual shape; submarginal line cinereous zigzag; marginal points black. Hind wings pale cinereous, brownish towards the exterior border. Length of the body, 10 lines; of the wings, 24 lines.

"West Canada. In the Rev. Mr. Bethune's collection."

Mr. Grote has suggested that this may be the same as *murænula* G. and R., but this can scarcely be so if the description is at all to be relied upon.

Agrotis reticens Wlk.

1865. Wlk., C. B. Mus., Lep. Het., xxxii, 692.

"Fœm.—Fuscescente cinerea, nigro conspersa, palpi oblique ascendentes, articulo 3o minimo; antennæ subsetulosæ; alæ anticæ lineis duabus nigris duplicatis; 1a, indeterminata; 2a, dentata; 3a, denticulata; spatio marginali nigricante lineam submarginalem angulosam

fuscescente cineream includente; orbiculari et reniformi nigro marginatis; posticæ cinereæ, apud marginem obscuriores, puncto discali venisque nigricantibus.

"Female.—Brownish cinereous, minutely black speckled. Palpi obliquely ascending, not rising near so high as the vertex; second joint with short hairs; third, extremely small. Antennæ very minutely setulose. Abdomen cinereous, extending a little beyond the hind wings. Fore wings with three transverse double black lines, first near the base, very incomplete; second, dentate on the inner side of the orbicular mark; third, denticulate beyond the reniform mark. Submarginal line zigzag, of the ground hue, but distinguished by the blackish shade which it traverses; marginal line composed of black lunules; orbicular and reniform marks blackish bordered, the former oblique and oblong, the latter of the usual form. Hind wings cinereous, darker toward the exterior border; discal point and veins blackish; fringe whitish. Length of the body, 7 lines; of the wings, 18 lines.

"West Canada. In the Rev. Mr. Bethune's collection."

Of the other names in the lists *A. niveivenosa* Grt. is an *Hadena; A. planalis* Grt. is a *Tæniocampid*, exact genus not made out from the specimen; *A. pyrophiloides* Harv. is not referable to the *Agrotids*, but has not yet received any place; *Pachnobia alaskæ* Grt. is an *Agrotiphila* and belongs near *Anarta* rather than *Agrotis*. Mr. Morrison's names are all accounted for, and his species, with two exceptions only, identified. I believe I have all of Guenée's species properly placed, and only the Walkerian species are in doubt. Of these I have given transcripts of all referred to *Agrotis*. They may belong almost anywhere else, and on the contrary there is every reason to believe that some of his species of *Mamestra* are really referable to this group of genera. It will require careful comparison by some one with a thorough knowledge of our own fauna to identify these species satisfactorily.

Mr. Strecker, in his Lep. Rhop. et Het., 79, records *Agrotis porphyrea* Hbn. from Labrador, a determination which I deem extremely questionable. Staudinger gives central and boreal, not arctic, Europe in the distribution, which does not accord well with a Labrador habitat. I have therefore omitted all reference to the species elsewhere, but call attention to the matter here for what it is worth.

APPENDIX.

Since the manuscript of this revision was handed in, only a few months ago, a number of species differing from all previously described have come into my hands, and these are for completeness described here and inserted in their proper places in the list of species. It has proved inexpedient to insert them in the body of the paper without too much change in the text; but I have in all cases in the descriptions indicated the nearest allies, and differentiated the species from those with which they most nearly resemble.

Large as is the assemblage here, many undescribed forms are still in collections, and every sending from the far western States brings to light new species. In the U. S. National Museum are some species, represented sometimes by one, sometimes even by several, bred specimens which I could not place satisfactorily to myself and which are therefore omitted. It is hoped that the present paper, by substituting a natural arrangement for the confused mixture in Mr. Grote's lists, will facilitate the proper determination of species in the collections.

Agrotis aurulenta sp. nov.

Ground color of head, thorax and primaries pale, whitish luteous, with a variably distinct reddish suffusion. Head and thorax immaculate. Primaries usually with basal and t. a. lines obsolete; in a specimen with a strong reddish suffusion the lines well defined, of the ground color, without darker margins; t. a. line then decidedly angulated. T. p. line very even, nearly parallel with the outer margin, marked by a series of venular short dashes, beyond which is a lighter shade line; in the suffused specimen the median space is reddish, and the contrast between it and the s. t. space defines the course of the line better. S. t. line traceable, slightly paler, somewhat irregular. A row of small terminal lunules. Claviform wanting. Orbicular round, small, slightly darker centered, with a somewhat paler annulus; obsolete in pale specimens. Orbicular moderate, somewhat constricted centrally, slightly paler ringed, inferiorly blackish powdered. Veins more or less blackish marked, especially the median and internal. Secondaries in the male soiled whitish, in the female blackish. Beneath white, with a more or less evident discal spot on primaries.

Expands 31–37^{mm}; 1.25–1.50 inches.

HABITAT.—Colorado, Nebraska, Arizona.

Four specimens, three males and one female, all from the collection U. S. National Museum, are before me. Three of these are from Mr. Bruce, collected, one ♂, "foothills near Denver," and this is the smallest and an almost immaculate specimen, the venular marks of t. p. line only being distinctly traceable; one ♀, "Platte Cañon, 6,500 feet," and this is the largest, the transverse maculation obsolete, the dusky markings of the veins most distinct; the third specimen is also a ♂, "Omaha, Nebr., June," and this has a distinct reddish shade to the t. p. line, all the maculation very well defined. The fourth specimen, without marked locality, is a ♂, which was given me years ago by Mr. George Frank, who had several others in his collection, I think, from Arizona. I suspected at that time that it might be my *medialis*, but it is evidently distinct generically; the specimen is most nearly like the Denver ♂, but is somewhat more distinctly marked. The antennæ are shortly pectinated and the wing form is like *ypsilon*. It is the only whitish species I have yet seen referrable to *Agrotis* as restricted by me.

Agrotis ingeniculata sp. nov.

General color of head, thorax, and primaries an ashen fuscous gray, the maculation all distinct. Thorax quadrate, without obvious tuftings. Collar with a central whitish line superiorly margined with a brown line tipped with whitish, which is inferiorly margined by blackish. Patagiæ gray margined, the gray limited inwardly by a blackish line. Primaries with basal line distinct, geminate, inner line black, included space paler whitish gray. T. a. line distinct, geminate; outer line black, included space whitish; at costa the line touches the orbicular in such a way that the outer line seems to encircle that spot, resuming its course on the costal vein, below which it is even, only slightly sinuate. T. p. line distinctly geminate only on costa, below which only the inner line is distinct, crenulate, almost parallel with outer margin. S. t. line very irregular, concolorous, limiting an ash-gray apical spot, defined below this by the darker terminal space and a vague, interrupted dusky preceding shade, most distinct opposite the cell. A very distinct narrow transverse shade line from lower edge of reniform, close to and parallel with t. p. line to inner margin. A series of dark terminal lunules. Claviform short, distinct, black margined, the margin diffuse inwardly and partly filling the spot. Orbicular large, somewhat irregular, outlined in black, within which is a white annulus, incomplete at the inner costal angle; center paler fuscous. Reniform large, kidney shaped, black margined, and within this a white annulus; center concolorous with a narrow whitish central line. The cell is darker around the ordinary spots, and a dark blotch precedes the apical pale patch. Secondaries smoky fuscous, paler basally. Beneath, primaries dark, smoky, secondaries grayish powdery; both wings with an outer line and discal lunule; terminal space rather paler, powdery. Expands 39^{mm}, 1.55 inches.

HABITAT.—Colorado.

A single perfect male from Mr. J. Angelman's collection, collected by Mr. Bruce. The species is a very distinct one, structurally allied to *geniculata*, than which it is much larger, but with much the same general appearance. It is a broad-winged species, resembling in that character *badinodes*. The front is bulging, but perfectly smooth. The antennal pectinations are very short, unlike those of *geniculata*, and shorter than in any other of the species referred to *Agrotis* as restricted by myself. The genitalia agree closely with those of *geniculata*, of which they may be considered the western representative.

Feltia longidens sp. nov.

Ground color of head and thorax pale luteous. Head immaculate; collar with a transverse blackish line, patagiæ black margined. Primaries with the median lines obsolete; t. p. barely indicated by venular dots opposite the cell. S. t. line concolorous, marked by the dusky terminal space and by a series of preceding, black, sagittate spots. This dark terminal space is interrupted on each vein, all of which send a ray of the ground color to the outer margin, giving the wings a characteristic radiate appearance which is unique. A black basal dash to which is attached the narrow, concolorous, loop-like claviform, which is narrowly black margined. A fine black line runs from the end of the claviform to the s. t. line. All the veins below the costal series are marked with blackish. The costal region is a paler shade of ground color, which also invades the orbicular; the latter is oblique, almost quadrate, the baso-costal side wanting; narrowly black margined. Reniform large, upright, normally shaped, finely black ringed, then with a rather broad paler annulus, leaving the center concolorous. Surrounding the reniform is a darker fuscous shade. Secondaries pure white in both sexes. Beneath, primaries smoky, the veins paler; secondaries white.

Expands 31–32^{mm}, 1.24–1.28 inches.

HABITAT.—Las Vegas, New Mexico.

Two specimens, a fairly good male and a very poor female, from Mr. Neumœgen's collection, taken by Mr. Meeske. The species is congeneric with *subgothica* and allies, which it resembles in habitus, but from all of which it differs by the radiate markings through the terminal space and by the pure white secondaries.

Porosagrotis dædalus sp. nov.

General color of head, thorax, and primaries pale fuscous gray, shaded with white. Collar marked with a fuscous line near tip. Patagiæ with a dusky fuscous margin. Primaries with the transverse maculation completely obsolete, the s. t. line only being even, indicated by a series of distinct or even prominent black sagittate spots or dashes, varying greatly in distinctness in the specimens before me. The claviform is

distinct, black lined, making a long narrow loop from base almost to the middle of the wing. The orbicular is reduced to a dusky or blackish indefinite elongate streak. The reniform is replaced by a blackish lunule at the end of the cell, around which is a variably diffuse and indefined shading. The veins are black marked, and with narrow accompanying whitish shades, which are most prominent on veins three, four, six, and seven. A whitish subcostal shading and a paler more yellowish shade from the end of the claviform to near the anal angle. Secondaries whitish fuscous, darker in the female. Beneath whitish, primaries with disk dusky, both wings with a discal lunule. Expands 37–39^{mm}, 1.50–1.55 inches.

HABITAT.—Colorado.

Four specimens, ♂ and ♀, are before me, all of them collected by Mr. Bruce—one of them from Mr. Angelman, the others from the collection U. S. National Museum. All are very much alike, differing only in the relative brightness of the maculation.

The genus *Porosagrotis* is proposed for a series of species of which *muræmula* is type, agreeing with *Carneades* Grt. in structure save as to the ♂ genitalia, the clasper in *Carneades* being lengthily bifurcate, while in the new genus it is always a single curved corneous more or less hook-like process. The present species is allied to *orthogonia* and *dollii* in the shortly pectinated antennæ, having the wing form of the latter species. The strigate maculation and the narrow loop-like claviform easily distinguish it from all its allies. The body is very robust, and the thoracic vestiture thick, giving the species a very plump appearance.

Carneades neomexicana sp. nov.

Ground color of head, thorax, and primaries a somewhat yellowish brick-red. Head inferiorly whitish. Collar inferiorly bright pale gray and tipped with the same color. Patagiæ marked discally with bright blue-gray, the thoracic tuftings, which are evident, marked by the same shade. Costal region of primaries bluish-gray, this shade sometimes extending also along internal margin, along the apical venules, and always along the median vein, branching on veins four and five and indenting the terminal space. Basal line indicated below median vein, geminate, paler, defining lines blackish. T. a. line distinct only below costal region, paler, outer defining line black, inner concolorous. T. p. line pale, geminate, the defining lines scarcely darker, usually indistinct below veins three and four, and sometimes the line is obsolete below the cell. S. t. line concolorous, marked by the dark terminal space and a dusky preceding shade, indented usually about half way across the terminal space on veins three and four. A series of fine terminal dots. Claviform small, black margined. Orbicular oblong, oblique, usually open to costa, black winged, then with a whitish annulus, center of palest shade of ground color. Reniform upright, moderate in size, normal in form, with a very narrow black and slightly paler annulus, centre uni-

form of a pale shade of ground color. All around and between the ordinary spots darker. A paler shade through submedian interspace, not reaching the anal angle. Secondaries of the male white, veins dusky, powdered; female dusky, paler bassally, veins still darker. Beneath white, powdery, disc of primaries, and in ♀ of secondaries also, darker.

Expands 30–33^{mm}; 1.20–1.30 inches.

HABITAT.—New Mexico.

Several specimens collected by Mr. Meeske are in the collections of Messrs. Hulst and Neumœgen. The species is a close ally of *quadridenta* Grt., and I should not be greatly surprised if it eventually proved a local variety of that species. The most striking character is the peculiarly bright reddish yellow ground color, contrasted by the blue-gray costal region and thoracic marking. The orbicular is oblique instead of round in all the specimens before me, and altogether the form is different from anything I have seen before, although many specimens of *quadridentata* have passed through my hands.

Carneades teleboa sp. nov.

Head, thorax, and primaries a faintly reddish, very pale luteous. Head and thorax immaculate. Primaries with basal and t. a. lines wanting. T. p. line very faintly distinguishable as a narrow line slightly darker than the ground color, a little emphasized on the veins. S. t. line vague, indefinite, irregular, concolorous, faintly traceable through the powdering of black scales that slightly darkens the outer part of the wing. A broad diffuse shade of black powderings crosses the wing a little beyond the middle. Orbicular obsolete. Reniform indefinite black powdered, forming a prominent feature at the outer margin of the powdery median shade. Secondaries pure white, immaculate. Beneath white; primaries with a slight reddish tinge, the black reniform spot marked; secondaries immaculate.

Expands 28^{mm}; 1.12 inches.

HABITAT.—Las Vegas, New Mexico.

A single female specimen from Mr. Neumœgen, collected by Mr. Meeske. The species is allied to *pedalis* in ground color and habitus but differs obviously by the obsolete transverse maculation and the broad, diffuse, powdery median shade. The tarsi are annulate with black.

Carneades lineifrons sp. nov.

A very pale whitish luteous. Head with a transverse dark line, thorax immaculate. Basal line geminate, the marginal lines interrupted, blackish, included space concolorous. T. a. line geminate, outwardly oblique, slightly irregular, the marginal lines widely separated, not interrupted; included space concolorous. T. p. line geminate, inner line crenulate distinct, evenly outcurved; outer line punctiform, represented by a row of venular dots. S. t. line concolorous, feebly

sinuate, relieved by the blackish terminal space and a blackish preceding shade. A distinct, broad, blackish, lunate transverse line through the outer part of median space. Claviform wanting. Orbicular large, concolorous, incompletely ringed by a powdery black line. Reniform moderate in size, blackish powdery without distinct defining line. Secondaries shading from soiled whitish at base to blackish at outer margin; veins smoky, discal spot of under side visible. Beneath whitish, primaries with disc blackish, a distinct outer line and a discal spot; secondaries with discal spot only.

Expands 33^{mm}; 1.30 inches.

HABITAT.—Colorado.

A single male specimen in good condition from collection U. S. National Museum, taken by Mr. Bruce,

The species is quite peculiar by the dark transverse line of front, which is not found in any of its allies. It is close to *pedalis* in type of maculation but exclusive of the ground color, the lack of the distinct orbicular and the dusky secondaries are quite sufficient to distinguish it. The tarsi are not annulate.

Carneades pedalis sp. nov.

General color of head, thorax, and primaries a fine reddish yellow, or topaz. Head and thorax immaculate. Primaries, basal line geminate, slightly paler, the outer defining line interrupted, blackish, powdery; t. a. line geminate, paler, very even and almost upright; marked on costa by two black spots, from the inner of which extends a black powdering relieving the line. T. p. line geminate, paler, marked costally by black spots, from the outer of which extends a curved black line reduced to a powdering below the cell; the inner line is defined only by the pale included shade and is crenulate; the general course is very even below the costal outcurve. Through the center of the wing is a rather broad, black, slightly irregular median shade line, which is the most prominent feature of the wing maculation. Beyond the t. p. line the s. t. space becomes powdery, darkening to black outwardly, and relieving the concolorous s. t. line, which is rather irregular and very distinct, except near anal angle, where the black shade is powdery. A row of narrow terminal lunules. Orbicular small, round, pale ringed, with concolorous center. Reniform moderate in size, normal in form, with an indistinct pale outline filled with black powderings. Claviform wanting. Secondaries pure white. Beneath white, primaries with a slight reddish suffusion, the dark reniform reproduced; secondaries immaculate. Tarsi annulate with black.

Expands 34^{mm}; 1.36 inches.

HABITAT.—Colorado.

A single male specimen only of this very pretty and distinctly marked species is before me, from the U. S. Museum collection, taken by Mr. Bruce. It belongs to the *messoria* group of the genus, but is unique in

every respect. The ringed tarsi ally it to *annulipes*, with which, however, it has little else in common.

Carneades xyliniformis sp. nov.

Ground color of head, thorax and primaries somewhat bluish ash-gray. Collar with a distinct black transverse line. Patagiæ decidedly blackish gray. Primaries strongly powdered with bluish white to the median shade, beyond which it is distinctly darker, black powderings replacing the white. Basal line geminate, concolorous, the defining lines narrow and black. T. a. line geminate, concolorous, the defining lines narrow and black, quite widely separated on costa, but quite approximate in the submedian interspace; very irregular, as a whole outwardly oblique, angulate on subcostal, outcurved in median and submedian spaces, and with a long outward curve below internal vein. A broad black median shade from costa over orbicular, outwardly oblique to the median vein, there obtusely angulate and almost upright to the hind angle; outwardly the shade grades off rather easily to the t. p. line, forming a little the darkest part of the wing. T. p. line crenulate, the inner line only defined, hardly distinct, outcurved over reniform, and then about parallel with outer margin. A darker, somewhat triangular ante-apical costal blotch outwardly defining the s. t. line, which else is barely traceable as a very narrow sinuate pale line. A narrow crenulate terminal line cutting into the fringes on the veins and giving the margin a scalloped appearance. Claviform large, concolorous, neatly black margined. Orbicular large, oval, narrowly black ringed, then with a wider whitish ring, else concolorous. Reniform large, kidney shaped, black ringed, slightly paler than ground color. Secondaries smoky fuscous with darker terminal line and pale fringes. Beneath ash-gray, powdery, primaries darker; both with an outer dusky line and discal spot.

Expands 40^{mm}; 1.60 inches.

HABITAT.—Las Vegas, New Mexico.

A single female from Mr. Neumœgen, collected by Mr. Meeske in 1889. This species is unique in appearance and has a strong habital resemblance to *Litholomia napæ*. In the synoptic table it falls readily into the *messoria* group and into the typical series, while really reminding one more in color and wing form of *euroides* of the *tessellata* group. The species is unique wherever placed, and is readily recognizable.

Carneades conjuncta sp. nov.

Ground color an even ashy fuscous. Head and thorax immaculate. Primaries with transverse lines geminate, the included space somewhat paler than ground color. Basal line evident, the defining lines equally distinct and black, even. T. a. line with an even outcurve, somewhat drawn in on the veins; outer line broad, distinct, blackish;

inner line more vague, but yet distinct. T. p. line outcurved over reniform, then evenly oblique to the hind margin: inner line black, narrow, crenulate, outer line scarcely defined, even. S. t. line sinuate, broad, rather diffuse, slightly paler than the ground color, outwardly marked by a few black scales. A row of terminal lunules, median shade vague, marked by a costal spot and below the cell by a diffuse blackish powdering parallel with the t. p. line. Claviform wanting. Orbicular moderate in size, round, black ringed, evenly paler than ground color. Reniform moderate in size, kidney shaped, rather incompletely black ringed, concolorous or slightly paler. Secondaries white, in the male immaculate, in the female with veins and outer margin slightly soiled. Beneath white, primaries powdery, with an outer line and discal spot, most evident in the female; secondaries in the male immaculate, in the female with a distinct discal spot.

Expands 36^{mm}, 1.45 inches.

HABITAT—Las Vegas, New Mexico.

A somewhat rubbed male, and a good female in Mr. Neumœgen's collection, taken by Mr. Meeske in 1889. This species is perhaps nearest to *brunneigera*, but distinct by the ashen fuscous color and white secondaries of both sexes. It has at first sight some resemblance to pale forms of *messoria*, but lacks the claviform. The median shade is vague, and this is one of the forms in which care is required in placing in its proper group.

Carneades perturbata sp. nov.

Rather pale luteo-fuscous in ground color of head, thorax and primaries. Head and thorax with black scales intermixed, forming a rather indefinite margin to patagiæ. Primaries with basal and s. t. spaces paler than median and terminal spaces. All the transverse lines geminate. Basal line well marked, the defining lines equally distinct, black, included space concolorous. T. a. line distinct, inner defining line scarcely less marked than the outer, which is black. Its course is outwardly oblique, outwardly curved in the interspaces. T. p. line outcurved over cell, then nearly parallel with outer margin: inner line distinct, lunulate rather than crenulate, outer line even, darker fuscous than ground color. S. t. line defined only by the difference in shade between s. t. and terminal spaces, and marked by a few irregularly placed black points; irregular in course, quite strongly indented on veins 3 and 4, without however resembling in other ways the *quadridentata* series. A series of black somewhat lunate terminal spots. Fringes with a pale line at base. Median shade line rather indistinct, upright, touching inner margin of reniform and reaching the hind margin at the same point with t. p. line. Claviform concolorous, distinctly outlined in black. Orbicular rather small, somewhat irregular, black ringed; somewhat paler than ground color, slightly darker centrally. Reniform well sized, somewhat constricted centrally, black

every respect. The ringed tarsi ally it to *annulipes*, with which, however, it has little else in common.

Carneades xyliniformis sp. nov.

Ground color of head, thorax and primaries somewhat bluish ash-gray. Collar with a distinct black transverse line. Patagiæ decidedly blackish gray. Primaries strongly powdered with bluish white to the median shade, beyond which it is distinctly darker, black powderings replacing the white. Basal line geminate, concolorous, the defining lines narrow and black. T. a. line geminate, concolorous, the defining lines narrow and black, quite widely separated on costa, but quite approximate in the submedian interspace; very irregular, as a whole outwardly oblique, angulate on subcostal, outcurved in median and submedian spaces, and with a long outward curve below internal vein. A broad black median shade from costa over orbicular, outwardly oblique to the median vein, there obtusely angulate and almost upright to the hind angle; outwardly the shade grades off rather easily to the t. p. line, forming a little the darkest part of the wing. T. p. line crenulate, the inner line only defined, hardly distinct, outcurved over reniform, and then about parallel with outer margin. A darker, somewhat triangular ante-apical costal blotch outwardly defining the s. t. line, which else is barely traceable as a very narrow sinuate pale line. A narrow crenulate terminal line cutting into the fringes on the veins and giving the margin a scalloped appearance. Claviform large, concolorous, neatly black margined. Orbicular large, oval, narrowly black ringed, then with a wider whitish ring, else concolorous. Reniform large, kidney shaped, black ringed, slightly paler than ground color. Secondaries smoky fuscous with darker terminal line and pale fringes. Beneath ash-gray, powdery, primaries darker; both with an outer dusky line and discal spot.

Expands 40^{mm}; 1.60 inches.

HABITAT.—Las Vegas, New Mexico.

A single female from Mr. Neumœgen, collected by Mr. Meeske in 1889. This species is unique in appearance and has a strong habital resemblance to *Litholomia napæ*. In the synoptic table it falls readily into the *messoria* group and into the typical series, while really reminding one more in color and wing form of *euroides* of the *tessellata* group. The species is unique wherever placed, and is readily recognizable.

Carneades conjuncta sp. nov.

Ground color an even ashy fuscous. Head and thorax immaculate. Primaries with transverse lines geminate, the included space somewhat paler than ground color. Basal line evident, the defining lines equally distinct and black, even. T. a. line with an even outcurve, somewhat drawn in on the veins; outer line broad, distinct, blackish;

ringed, only slightly paler than ground color, somewhat darker at extremities. Secondaries of male white. Beneath, primaries pale fuscous gray, outwardly powdery, with a dusky shade line and faint discal spot; secondaries immaculate.

Expands 34^{mm}, 1.35 inches.

HABITAT—Colorado.

A single male specimen, collected by Mr. Bruce is in the collection U. S. National Museum. This is an evident ally of *messoria*, which it resembles closely in all the maculation of primaries, but from which it differs obviously by the pure white secondaries. It is also smaller than the average *messoria*, and the body, compared with the wings, is more robust in appearance.

P. wockei Moeschl.*
scropulana Morr.

Genus SETAGROTIS Smith.

S. planifrons Smith.
S. congrua Smith.

Genus AGROTIS Tr.

A. badinodes Grt.*
A. violaris G. & R.
A. aurulenta Smith.*
A. ypsilon Rott.*
suffusa S. V.
telifera Harr.
idonea Cram.
A. geniculata G. & R.*
A. ingeniculata Smith.
A. quarta Grt.
A. bollii Grt.
hilaris ‖ Grt.

Genus PERIDROMA Hbn.

§

P. occulta Linn.*
P. præfixa Morr.
P. astricta Morr.*
P. grandipennis Grt.
P. saucia Hbn.*
inermis Harr.
ortonii Pack.
var. margaritosa Haw.
P. rudens Harv.*
P. pellucidalis Grt.*

§

P. incivis Gn.
alabamæ Grt.
? *infecta* Ochs.
P. tenuescens Smith.
P. simplaria Morr.*
P. digna Morr.*
nigrovittata Grt.

Genus NOCTUA Linn.

§

N. baja Fab.*
N. normaniana Grt.*
triangulum ‡ Auct.
obtusa Spey.
N. esurialis Grt.
N. bicarnea Gn.*
plagiata Wlk.
N. treatii Grt.*
N. conchis Grt.
N. c.-nigrum Linn.*
N. hospitalis Grt.
N. perconflua Grt.*
conflua ‡ Auct.
? *jucunda* Wlk.
N. erieasis Grt.
N. phyllophora Grt.*
dahlii ‡ Beth.
N. rubifera Grt.*
rubi ‡ Grt.
dahlii ‡ Gn.
N. oblata Morr.*
hilliana Harv.
N. rosaria Grt.*
N. rava H. Sch.*
umbrata Pack.
N. fennica Tausch.*
N. plecta Linn.*
vicaria Wlk.
N. collaris G. & R.*

§

N. haruspica Grt.*
unimacula Morr.
grandis Spey.
N. sierræ Harv.
N. clemens Smith.*
N. clandestina Harr.*
unicolor Wlk.
N. havilæ Grt.*
N. piscipellis Grt.
N. atrifrons Grt.
N. tepperi Smith.
N. lubricans Gn.*
var. beata Grt.*
N. vocalis Grt.
invenusta Grt.
N. opacifrons Grt.*
N. pallidicollis Grt.
cinereocollis ‖ Grt.

Genus CHORIZAGROTIS Smith.

C. auxiliaris Grt.*
C. introferens Grt.*
C. sorror Smith.*
C. agrestis Grt.*
mercenaria Grt.
flexilis Morr.
C. inconcinna Harv.*
C. immixta Grt.*
C. terrealis Grt.

Genus RHIZAGROTIS Smith.

§

R. abnormis Smith.

§

R. proclivis Morr.
R. acclivis Morr.
opaca Harv.
R. albicosta Smith.*

R. apicalis Grt.

§

R. lagena Grt.*
R. albalis Grt.*
oloanthoides Grt.

Genus FELTIA Wlk.

F. olivia Morr.
F. longidens Smith.
F. subgothica Steph.*
jaculifera Gn. in part.
ducens Wlk.
F. jaculifera Gn.*
tricosa Lint.
F. herelis Grt.*
jaculifera var. Gn.
F. pectinicornis Smith.*
F. evanidalis Grt.

§

F. circumdata Grt.
F. gladiaria Morr.*
morrisoniana Riley.
F. venerabilis Wlk.*
incallida Wlk.
F. gravis Grt.
vapularis Grt.
F. vancouverensis Grt.*
clodiana Grt.
semiclarata Grt.
hortulana Morr.
F. æneipennis Grt.*
F. volubilis Grt.*
stigmosa Morr.
F. annexa Tr.*
F. malefida Gn.*

Genus POROSAGROTIS Smith.

P. murænula G. & R.*
vetusta Wlk.
P. catenula Grt.*
P. obesula Smith.*
P. satiens Smith.
P. mimallonis Grt.*
rufipennis Grt.
P. fusca Bdv.
septentrionalis Moeschl.
P. worthingtoni Grt.
P. rileyana Morr.*
P. orthogonia Morr.*
P. dædalus Smith.*
P. dollii Grt.
P. milleri Grt.*
P pluralis Grt.

Genus CARNEADES Grt.

§

C. wilsonii Grt.*
specialis Grt.
C. lacunosa Morr.*
C. æqualis Harv.

§

C. recula Harv.*
C. cicatricosa G. & R.*
C. neomexicana Smith.
C. quadridentata G. & R.*
C. niveilinea Grt.*
C. insertans Smith.
C. brevipennis Smith.*
C. oblongistigma Smith.*
C. plagigera Morr.*
C. olivalis Morr.*
C. ridingsiana Grt.*
C. flavidens Smith.*
C. flavicollis Smith.*
C. perexcellens Grt.*
docilis Grt.

§

C. bicollaris Grt.*
C. brocha Morr.*
C. sponsa Smith.*
C. cogitans Smith.*
C. hollemani Grt.*
C. atristrigata Smith.
C. biclavis Grt.*
C. perpolita Morr.*
C. fumalis Grt.*
C. perfusca Grt.
C. pastoralis Grt.*
C. finis Smith.*
C. velleripennis Grt.*
C. atomaris Smith.*
C. texana Grt.*
C. gagates Grt.*
C. citricolor Grt.*
C. misturata Morr.*
C. mœrens Grt.
C. dolis Grt.
C. scandens Riley.*
C. choris Harv.
C. pleuritica Grt.*
C. remota Smith.
C. pitychrons Grt.*
personata Morr.
C. infracta Morr.
C. luteola Smith.*
C. serricornis Smith.*
C. tetrica Smith.*

§

C. bostoniensis Grt.*
C. cænis Grt.*

muscosa Grt.
C. medialis Smith.*
C. fenesica Harv.*
C. extranea Smith.
C. trifasciata Smith.
C. bifasciata Smith.*
C. comosa Morr.
C. xyliniformis Smith.
C. messoria Harr.*
cochrani Riley.
repentis G. & R.
lycarum ‡ G. & R.
spissa Gn.
balanitis Grt.
confracta Morr.
C. perturbata Smith.*
C. rubefactalis Grt.
C. fauna Morr.
C. brunneigera Morr.*
C. conjuncta Smith.
C. incallida Smith.
C. lutulenta Smith.*
C. annulipes Smith.*
C. pedalis Smith.*
C. lineifrons Smith.*
C. teleboa Smith.
C. murdocki Smith.*
C. quinquelinea Smith.
C. friabilis Grt.*
C. fuscigera Grt.*
C. orbicularis Smith.
C. micronyx Grt.
C. intrita Morr.*

§

C. fernaldi Morr.
C. opipara Morr.*
islandica ‡ Grt.
C. tristicula Morr.
C. munis Grt.*
sublatis Grt.
C. dissona Moeschl.
C. euroides Grt.
perpura Morr.
C. alticola Smith.*
C. rufula Smith.*
C. basiflava Smith.*
C. satis Harv.
C. rena Smith.*
C. insignata Wlk.*
illata Wlk.
declarata Wlk.
campestris Grt.
decolor Morr.
var. verticalis Grt.*
C. lewisii Grt.
C. tessellata Harr.*
maizi Fitch.
atropurpurea Grt.
C. albipennis Grt.*
♀ *nigripennis* Grt.
C. spectanda Smith.
C. pallipennis Smith.*
C. basalis Grt.*
C. solitaria Smith.
C. nostra Smith.*
C. ochrogaster Gn.*
cinereomaculata Morr.
gularis Grt.
turris Grt.
C. idahoensis Grt.*
C. furtivus Smith.*
C. westermanni Stgr.
C. obeliscoides Gn.*
sexatilis Morr.
C. infelix Smith.*
C. islandica Stgr.
C. divergens Wlk.*
versipellis Grt.
C. colata Grt.
C. redimicula Morr.*
C. atrifera Grt.
C. tesselloides Grt.*
C. strigilis Grt.
C. silens Grt.

SPECIES NOT PLACED.

Agrotis dapsilis Grt.
fishii Grt.*
juncta Grt.
viralis Grt.
nanalis Grt.
drewseni Stgr.
littoralis Pack.
hero Morr.
tenuicola Morr.
radix Wlk.
mollis Wlk.
perlentans Wlk.
patula Wlk.
hæsitans Wlk.
insula Wlk.
ordinata Wlk.
reticens Wlk.
illapsa Wlk.

EXPLANATION OF PLATES.

The figures are numbered consecutively, but not regularly arranged on the following plates.

PLATE I.

An ideal species in which all the ordinary Noctuid maculation is present. The lettering is as follows:

b.—basal line or half line—here it is geminate.

t. a.—t. a., or transverse anterior line—also geminate.

t. p.—t. p., or transverse posterior line—also geminate, outer line emphasized on the veins, line sinuate.

s. t.—s. t., or subterminal line—line sinuate, preceded by a dusky shade.

t.—terminal line, dots or lunules.

m.—median shade or line.

The basal space is between the body and the t. a. line; median space between the t. a. and t. p. lines; s. t. space between the t. p. and s. t. lines; terminal space between the s. t. line and outer margin.

cl.—claviform spot.

or.—orbicular spot.

ren.—reniform spot.

The reniform and orbicular are the "ordinary spots" or the "stigmata" of some authors.

b. d.—basal dash.

a. p.—apex of primaries—with a pale apical spot.

h. a.—hind angle of primaries.

c. m.—costal margin.

o. m.—outer margin of primaries; *o. m.*^{1}, same of secondaries.

i. m.—inner margin of primaries; *i. m.*^{1}, same of secondaries.

h. a.—hind angle of primaries.

d. s.—discal spot on secondaries.

e. l.—exterior line on secondaries.

apex—apex of secondaries.

s. m.—submedian, or internal vein.

an.—anal angle of secondaries.

The fringes are omitted in the figure.

PLATE II.

1 Harpe and clasper of *R. chardinyi*.
2 " " *R. brunneicollis* and *rufipectus*.
3 " " *R. cupida*.
3*a* Head of *R. cupida*, showing the palpal form usual in the genus.
4 Harpe and clasper, essentially alike in *cupidissima vittifrons, variata, placida*.
5 Harpe and clasper of *R. alternata*.
6 " " *R. belfragei*.
6*a* " " *R. formalis*.
7 " " *R. binominalis*.
8 " " *R. distracta*.

9 Harpe and clasper of *R. crenulata* and *confusa*.
10 " " *A. prasina*.
11 " " *A. vernilis*.
12 " " *P. speciosa*.
13 " " *P. pressa* and *P. fusca*.
14 " " *P. imperita*.
15 " " *E. sigmoides*.
16 " " *E. perattenta*.
17 " " *A. erratica*.
18 " " *S. elimata*.
19 " " *S. catherina*.
20 " " *P. salicarum*.
21 " " *P. carnea*.

PLATE III.

22 Harpe and clasper of *P. wockei*.
23 " " *S. congrua*.
24 *Agrotis badinodes*, harpe and clasper; *a*, body structure from above; *b*, venation; *c*, antenna of male; *d*, fore tibia.
25 *Agrotis ypsilon*, harpe and clasper; *a*, body structure from above; *b*, same from side; *c*, antenna of ♂; *d*, fore tibia of ♂; *e*, fore tibia of ♀.
26 Wanting.
27 Harpe and clasper of *A. geniculata*.
28 " " *P. occulta*.
29 " " *P. saucia*.
30 " " *P. rudens* and *pellucidalis*.
31 " " group *incivis*, and of *N. lubricans*.
36 " " *N. phyllophora*.

PLATE IV.

32 Harpe and clasper of *N. baja*.
33 " " *N. normaniana*.
34 " " *N. bicarnea*.
35 " " *N. c-nigrum*.
35*a* Palpus of *N. c-nigrum*.
37 Harpe and clasper of *N. rubifera*.
38 " " *N. oblata*.
39 " " *N. rava*.
40 " " *N. fennica*.
41 " " *N. plecta*.
42 " " *N. clandestina*, *sierræ* and *haruspica*.
43 " " *N. collaris*.
44 " " *N. atrifrons*.
45 " " *C. auxiliaris*.
46 " " *C. introferens*.
47 " " *C. agrestis*.
48 " " *C. inconcinna*.
49 " " *C. terrealis*.
50 " " *R. proclivis*.
51 " " *R. acclivis*.
52 " " *R. albicosta*.
53 " " *R. apicalis*.
54 " " *R. lagena*.
55 " " *R. albalis*.

56 *Feltia subgothica: a*, harpe and clasper—that of *jaculifera, herelis, annexa,* and *malefida* is the same; *b*, structure of body from side; *c*, anterior tibia; *d*, palpus; *e*, antennal joint from top; *f*, antennal joint, cross-section, ♂.

57 *Feltia jaculifera: e*, antennal joint from top; *f*, antennal joint, cross-section, ♂.

58 *Feltia herelis: e*, antennal joint from above; *f*, cross-section of antennal joint, ♂.

59 *Feltia pectinata: e*, antennal joint from above; *f*, cross-section of antennal joint, ♂.

PLATE V.

60 *Feltia gladiaria: a*, harpe and clasper—*venerabilis, vancouverensis,* and *gravis* are the same; *b*, antenna of ♂; *venerabilis* is the same; *c*, anterior *tibia; d*, front of head.

61 *Feltia volubilis: a*, harpe and clasper; *d*, front of head.

62 Harpe and clasper of *Porosagrotis:* All the species are essentially alike in this, so far as examined.

63 Harpe and clasper of *Carneades wilsonii.*

64 " " *Carneades insignata;* with this agree *albipennis, tesselloides, infelix, intrita, tristicula, redimicula, micronyx, abnormis, versipellis, atrifera, messoria, brunneigera.*

65 Harpe and clasper of *C. niveilinea, flavidens, rena, cogitans.*

66 " " *C. pitychrous, velleripennis, insertans.*

67 " " *C. cænis.*

68 Harpe and clasper of *C. bifasciatus, gagates, choris, satis, oblongistigma, turris, fuscigera, recula, cicatricosa, serricornis, tessellata, fortunalis, lacunosa.*

69 Harpe and clasper of *C. pastoralis.*

70 " " *C. bicollaris.*

71 " " *C. bostoniensis.*

72 " " *C. perpolita.*

73 " " *C. scandens.*

74 " " *C. brocha.*

75 " " *C. pallipennis, misturata, sublatis.*

76 " " *C. obeliscoides.*

77 " " *C. citricolor, basalis.*

78 " " *C. comosa, plagigera, infracta.*

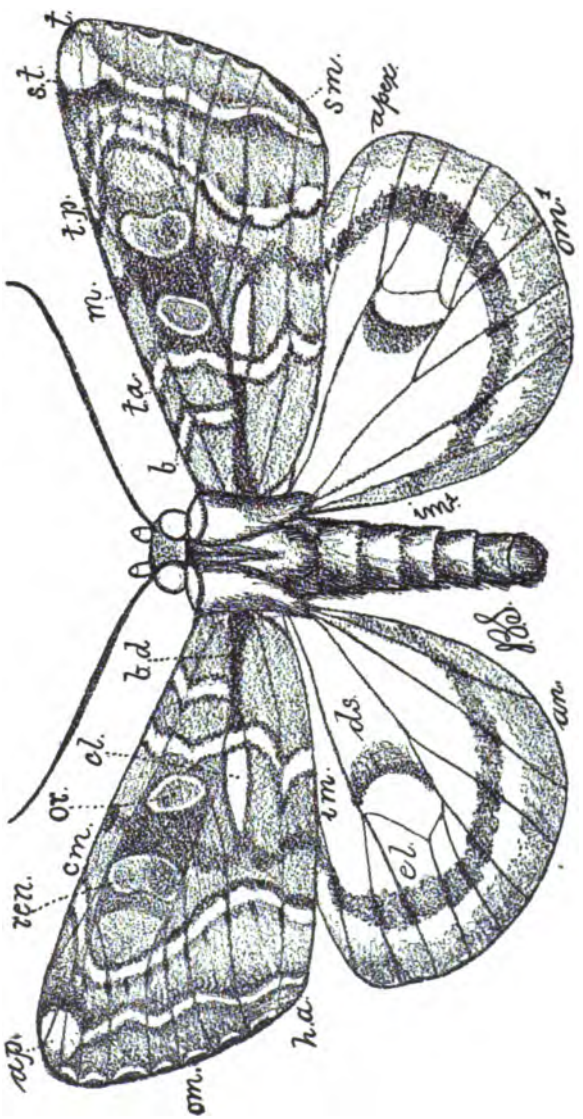
79 " " *C. fenesica.*

80 " " *C. rubefactalis.*

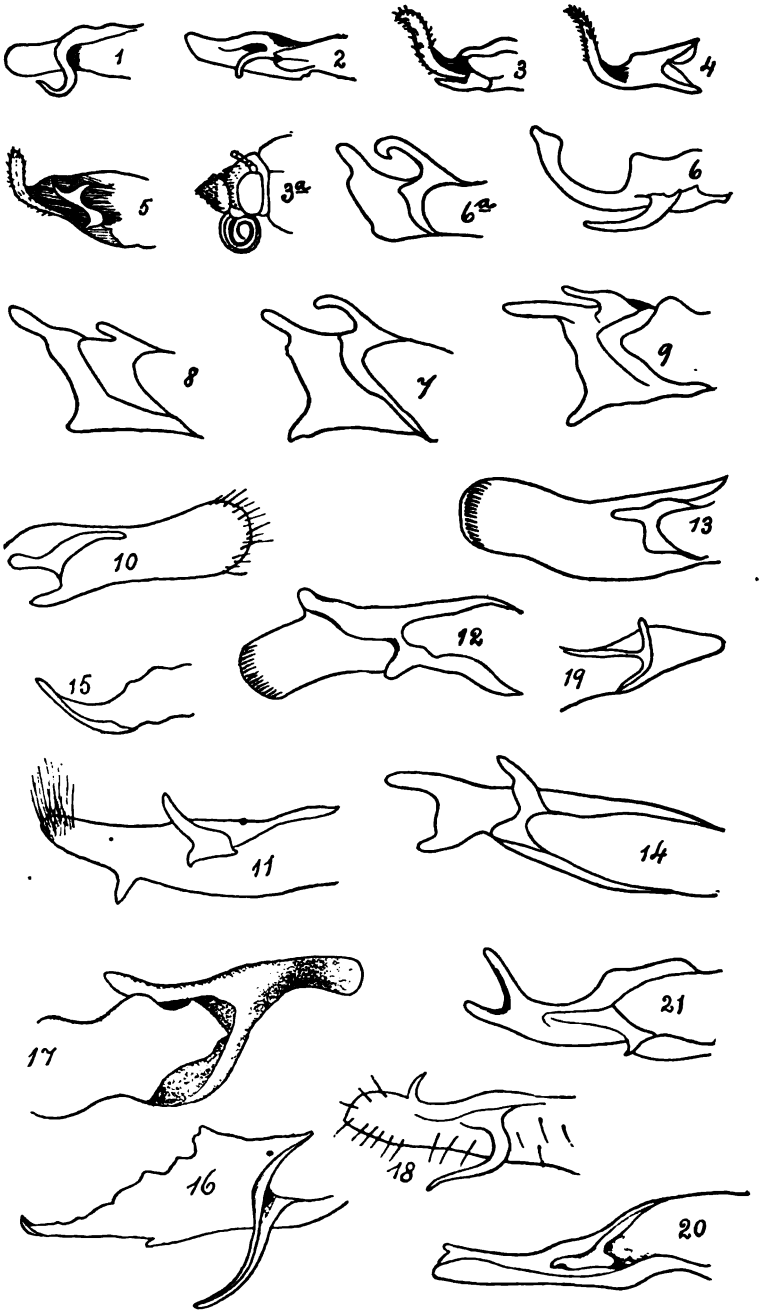
81 " " *C. hollemanni.*

82 " " *C. fumalis, tetrica.*

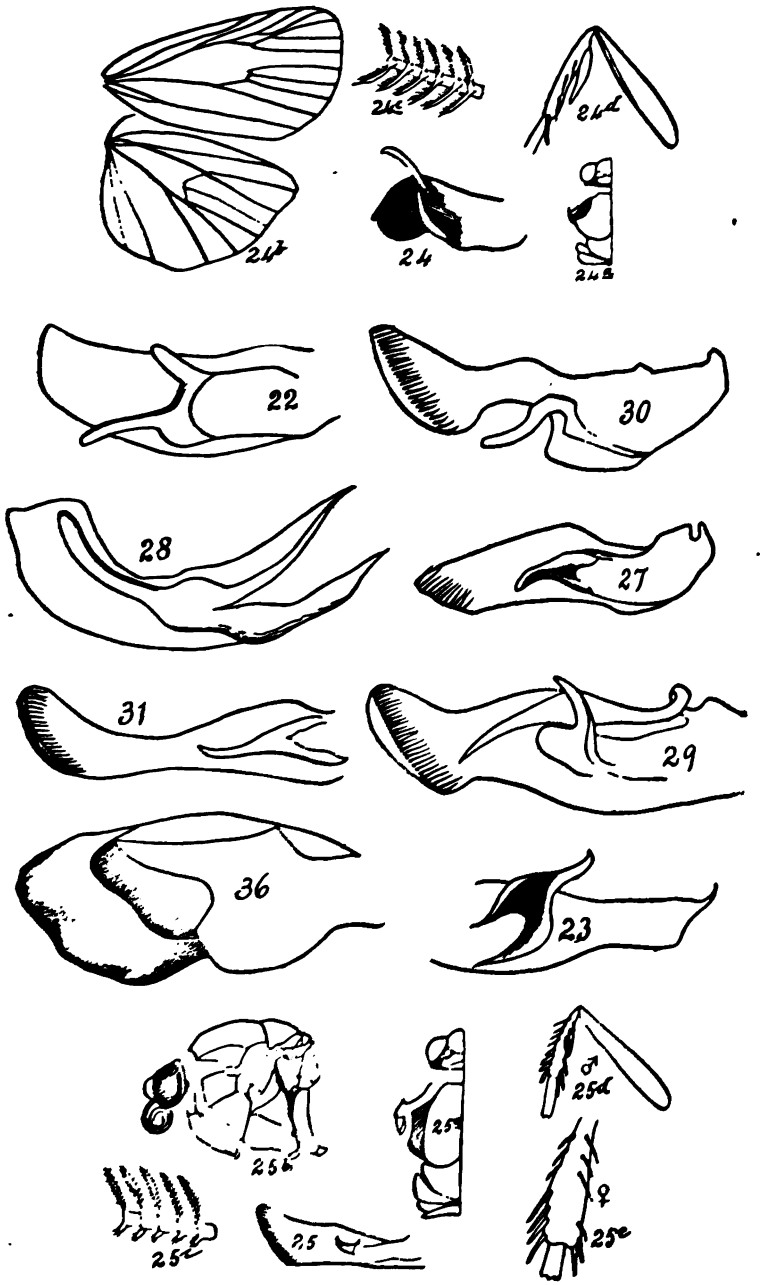
83 " " *C. finis, medialis.*



IDEAL AGROTID, SHOWING THE NORMAL MACULATION AND HABITUS.



SEXUAL AND OTHER CHARACTERS OF AGROTIDS.



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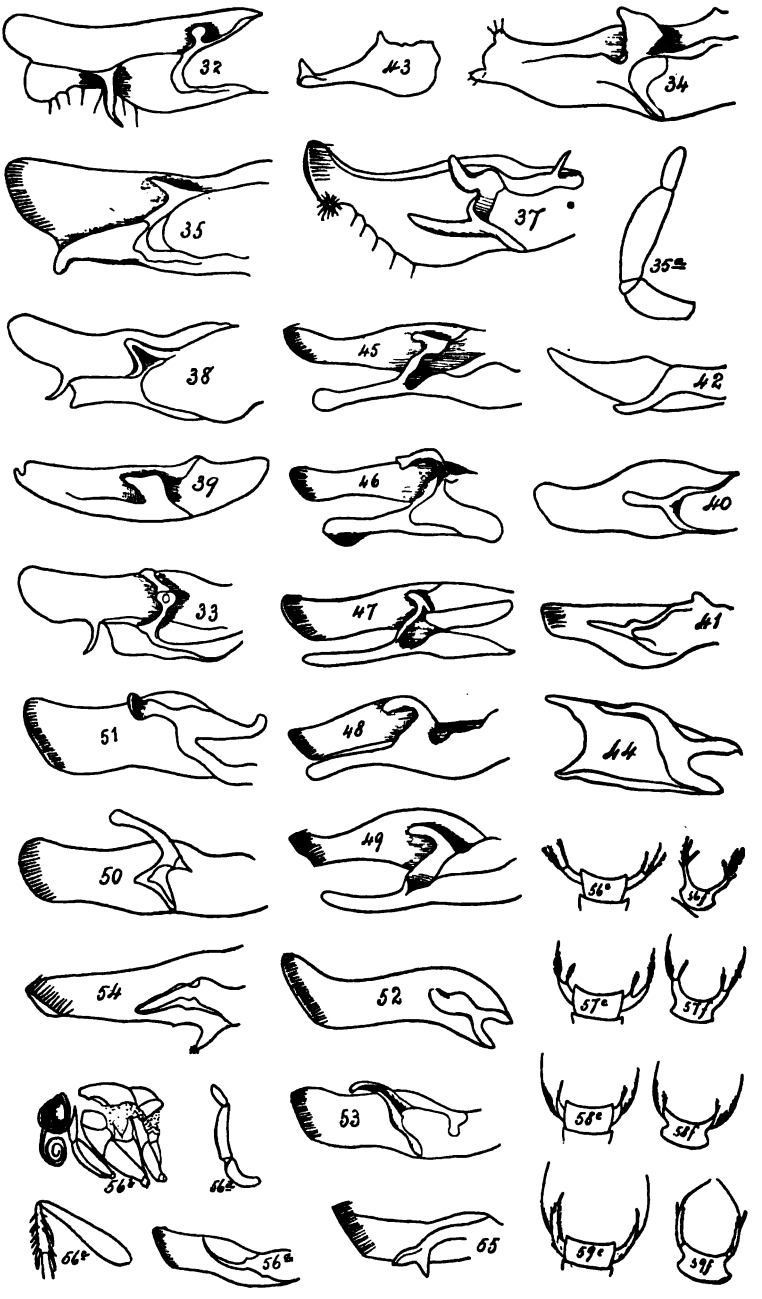
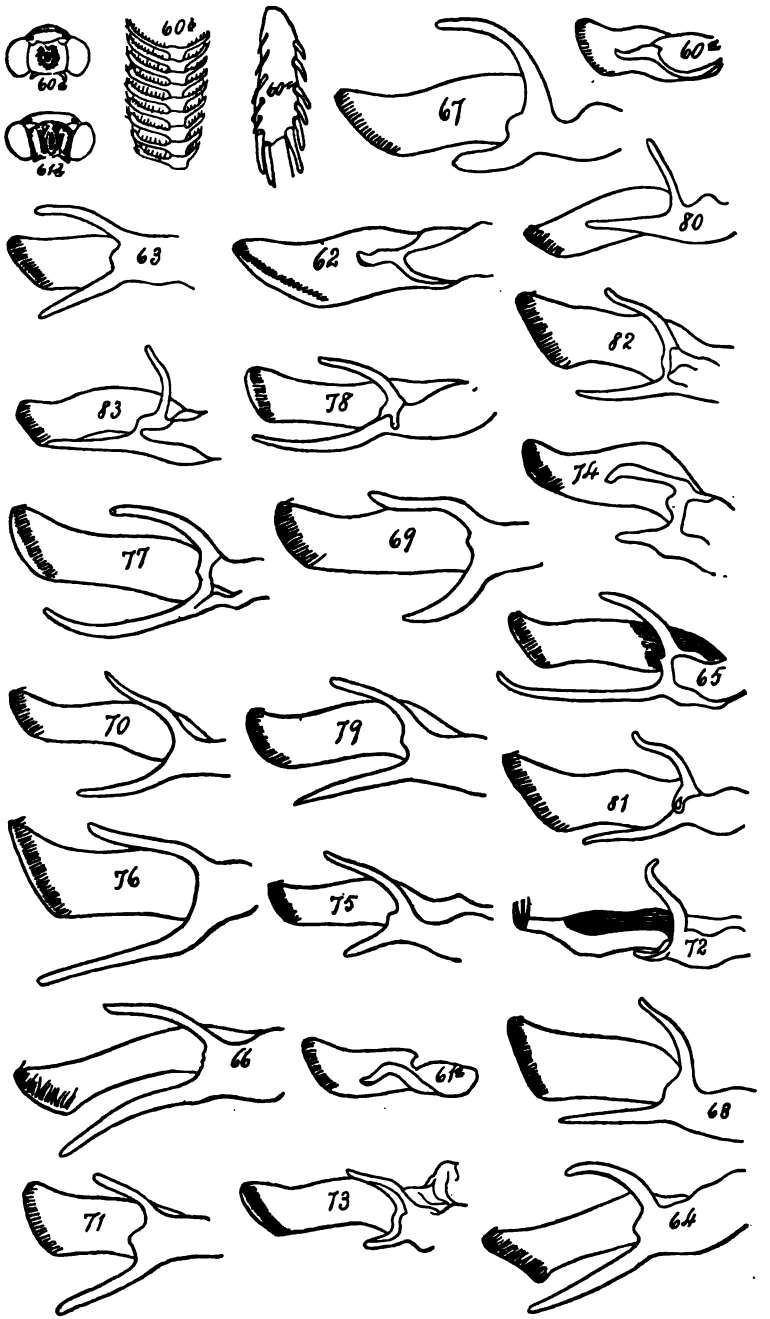


SEXUAL AND OTHER CHARACTERS OF AGROTIDS.



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